

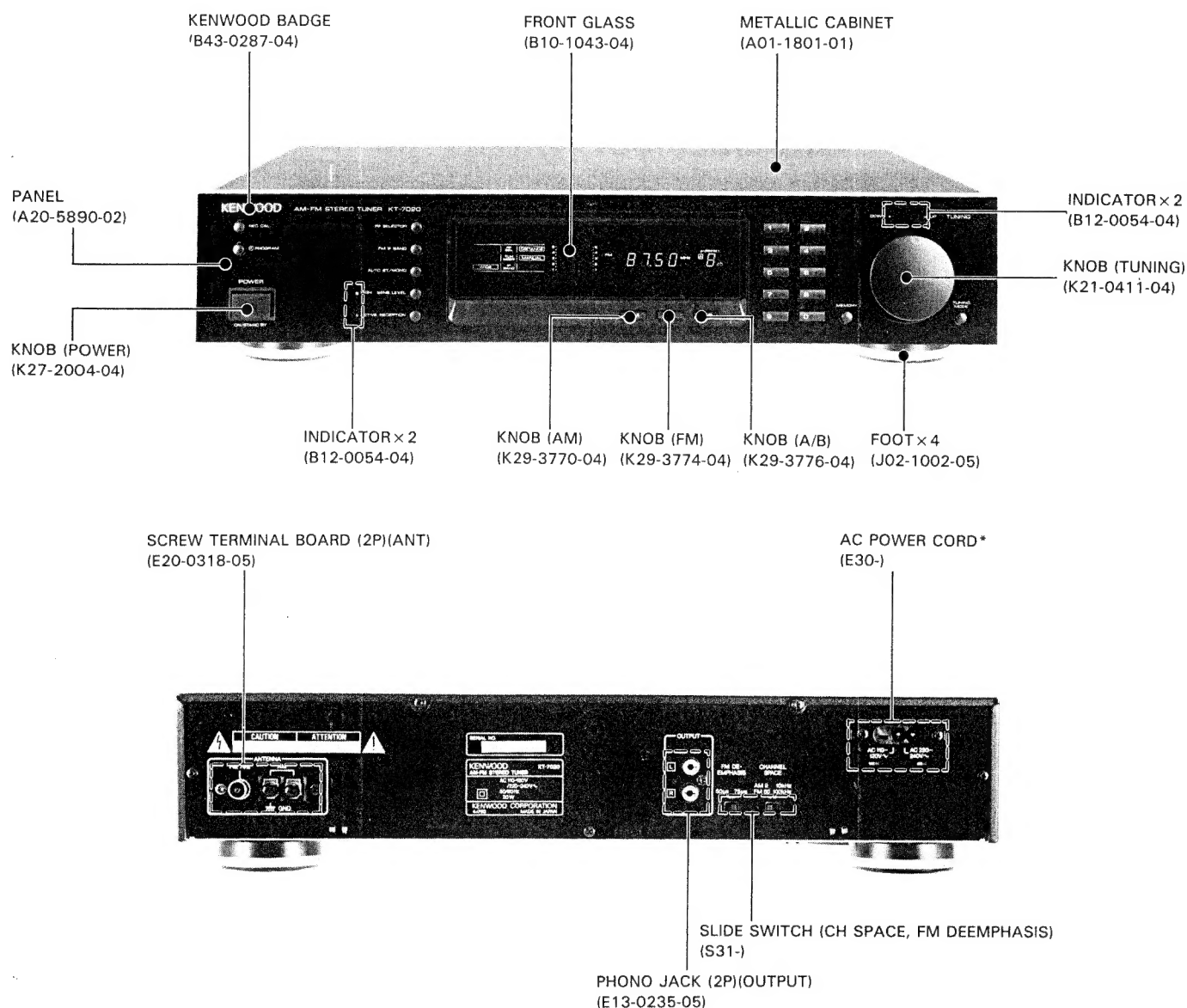
AM-FM STEREO TUNER

# KT-7020

## SERVICE MANUAL

# KENWOOD

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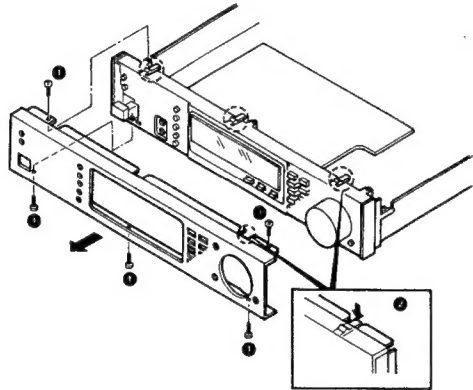
\*Refer to parts list on page 45.

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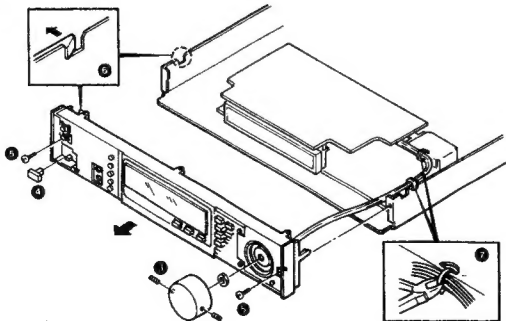
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DISASSEMBLY FOR REPAIR

- 1. Remove the five screws (1).
- 2. Undo the three catches (2), and detach the front panel.

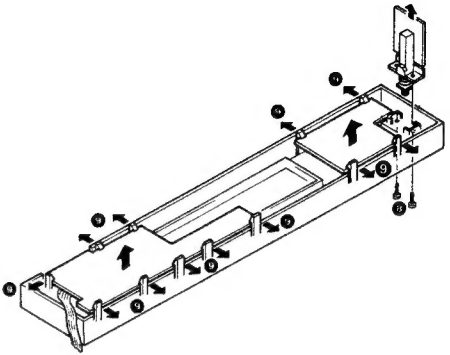


- 3. Remove the two cast screws (3) together with their accompanying nuts.
- 4. Detach the POWER knob (4).
- 5. Remove the two screws (5).
- 6. Undo the two catches (6) at the both sides.
- 7. Release the two belts (7), and detach the sub panel.

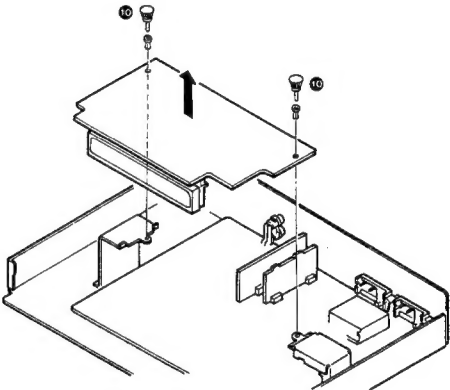


DISASSEMBLY FOR REPAIR

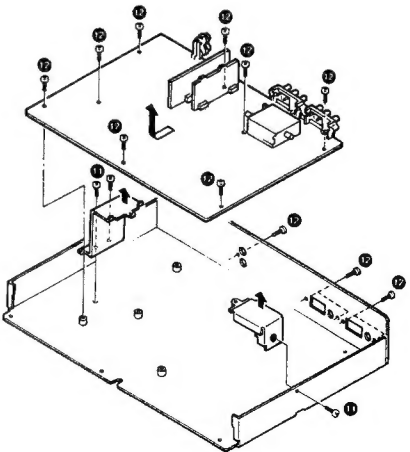
- 8. Remove two screws (8), and disconnect the board.
- 9. Undo the twelve catches (9), and disconnect two boards.



- 10. Remove the two push rivets (10), and disconnect a board.

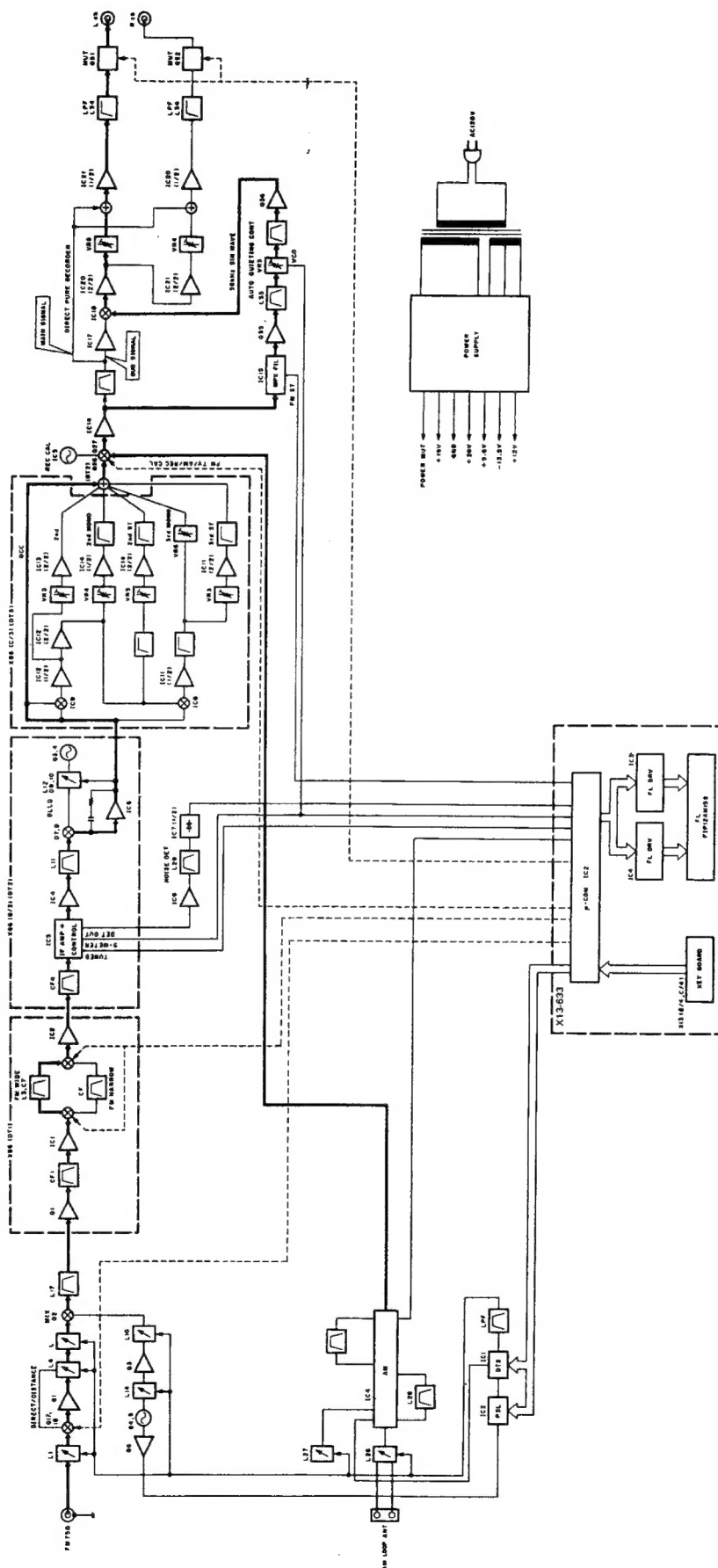


- 11. Remove the three screws (11), and detach two brackets.
- 12. Remove the thirteen screws (12), and disconnect a board.



# KT-7020

## BLOCK DIAGRAM



# KT-7020

## CIRCUIT DESCRIPTION

### Function of components

Tuner unit (X05-342X-XX)

Components	Use/Function	Operation/Condition/Interchangeability
Q1	FM RF amplifier	
Q2	Mixer	
Q3	FM OSC (TUNED) buffer	
Q4,5	FM OSC	
Q6	OSC buffer	For PS.
Q8	Regulator (control)	12V power supply for FM circuitry.
Q9	Regulator (error amplifier)	
Q10	AM power switch	Power switch for AM circuitry.
Q11	FM/AM power control	When the base is "H" (set by 5V from the microprocessor), Q10 is turned ON setting the AM mode.
Q12~14	PLL loop filter	
Q15,16	DIS/DIR switching	Goes ON when the input is "H". Turns Q17 and Q18 ON.
Q17,18	DIS/DIR switching	Driver. Q17 is ON for DIS and Q18 is ON for DIR.
Q19~21	WIDE/NARROW switching	When the input to Q19 is "H", Q20 is turned ON (Wide).
Q22	STOP control	When the output from IC8 (2/2) is "L", Q22 is turned ON and the STOP signal goes "L".
Q23	STOP SENS switching	SENS is High when the input is "H".
Q24,25	REC CAL control	REC CAL is set when the input to Q24 is "H".
Q26	AM switching	Switches the AM signal.
Q27	REC CAL switching	Switches REC CAL.
Q28	Forced Mono control	Forced Mono mode is set when the input is "H".
Q34	Auto quieting control	Automatically controls the SUB demodulation level during the small antenna input operation.
Q35	38kHz sine wave generator amplifier	Using the tuning circuit (38kHz) of LC as the load, turns the rectangular wave into a sine wave.
Q36	38kHz buffer amplifier	Sends the 38kHz signal from the tank circuit to the SUB demodulator at a low impedance.
Q37	Current mirror constant-current circuit	Used as the load resistance to IC18.
Q38		Performs current regulating operation together with Q37.
Q39		Used as the load resistance to IC18.
Q40		Performs current regulating operation together with Q39.
Q41,42		Constant-current load (GND side).
Q43	Gain switching	Goes ON in Narrow mode to control the separation (Narrow).
Q44	SUB signal demodulation switching	OFF in Stereo mode, ON is Mono mode.
Q51,52	OUTPUT muting	Used for muting the output signal.
Q53,54	Muting control	Muting is activated when the base of Q54 is "L".
Q55	Regulator	Main 15V output.
Q56,57	Regulator	-13V output.
Q58,59	Regulator	For +28V Vr.
Q60	Regulator	For +5V PLL, prescaler IC.
Q61	Regulator	-17.5V for FL.

## CIRCUIT DESCRIPTION

Components	Use/Function	Operation/Condition/Interchangeability
IC1 (LM7001)	PLL IC	Reference frequencies FM: 25kHz/50kHz, AM: 9kHz/10kHz.
IC4 (LA1245)	AM system	
IC5 (M5218P)	REC CAL	Generates REC CAL signal (400Hz).
IC6 (BA401)	Noise amplifier	120kHz noise tuning amplifier.
IC7 (M5218P)	1/2 Noise OUT	Noise present/absent output. 5V output when present.
	2/2 DIS/DIR. OUT	5V output when ANT input is 70dB $\mu$ .
IC8 (M5218P)	1/2 STOP detect OUT	Outputs the STOP signal.
	2/2 STOP detect	Detects the TUNED bandwidth in FM mode.
IC9 (M5218P)	T meter control	Controls the lighting of the T meter (red portions on the left and right).
IC14 (NJM4560D)	Notch filter	114kHz.
IC15 (LA3361)	38kHz generator (sine wave)	Auto quieting control, beacon control.
IC16 ( $\mu$ PC78L12J)	3-terminal regulator	IN: +15V, OUT: +12V.
IC17 (NJM4560D)	MAIN signal buffer	
IC18 (MC1495L)	SUB signal demodulator	Linear multiplier.
IC19 (M5218P)	Subcarrier buffer	38kHz.
IC20 (NJM4560D)	1/2 Stereo demodulator, deemphasis	Adds the MAIN and SUB signals.
	2/2 SUB signal demodulator	Current/voltage converter.
IC21 (NJM4560D)	1/2 Stereo demodulator, deemphasis	Adds the MAIN and SUB signals.
	2/2 SUB signal demodulator	Current/voltage converter.
IC22 (M5231TL)	Regulator	V <sub>REG</sub> = 1.8V, for +15V
IC23 ( $\mu$ PC7805HF)	3-terminal regulator	5V (output 5.6V).

## IF-DET UNIT (X86-102X-XX)

Components	Use/Function	Operation/Condition/Interchangeability
Q1	IF amplifier	
Q3,4	PLL DET VCO	10.7MHz.
Q5	FM signal switching	Switches over between REC CAL, AM, etc.
Q6	Gain control	Turns ON to rise the gain when in the NARROW mode.
Q7	DCC ON-OFF switching	Corrects distortion based on the auto stop signal input.
IC2,3 (BA401)	IF amplifier	
IC4 ( $\mu$ PC1163HA)	IF amplifier	
IC5 (LA1231NS)	IF system	IF amplifier, band muting signal generator, S meter, quadrature detector.
IC6 (NJM4560D)	1/2 PLL DET DC amplifier	
	2/2 FM/AM signal amplifier	

## CIRCUIT DESCRIPTION

Components	Use/Function	Operation/Condition/Interchangeability
IC8 (NJM4200D)	Tertiary distortion generator	Linear multiplier.
IC9 (NJM4200D)	Secondary distortion generator	Linear multiplier.
IC11 (M5218P)	1/2 Tertiary current/voltage converter	
	2/2 Distortion phase correction amplifier	Tertiary distortion is Stereo mode.
IC12 (M5218P)	1/2 Secondary distortion current/voltage converter	
	2/2 Distortion output correction amplifier	Increases distortion in NARROW mode.
IC13 (M5218P)	1/2 Reference voltage generator	V <sub>CC</sub> /2 = 7.5V.
	2/2 DET distortion correction amplifier	Corrects the distortion in PLL DET.
IC14 (M5218P)	1/2 Mono distortion correction amplifier	Used for correcting the secondary distortion.
	2/2 Stereo distortion correction amplifier	Used for correcting the tertiary distortion.

## Sub-circuit unit (X13-633X-XX)

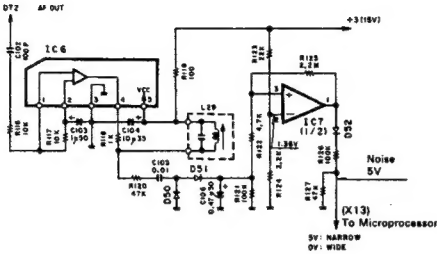
Components	Use/Function	Operation/Condition/Interchangeability
IC1 ( $\mu$ PD4069UBC)	Waveform shaper	The Schmitt circuit shapes the waveforms of the CE, UP and DOWN pulses.
IC2 (CXP5016-216S)	Microprocessor	
IC3,4 (LC7570)	FL driver	
IC5 (M5218P)	S meter temperature compensator	Corrects the S meter lighting point error due to temperature.
Q1	RESET control	When turned ON, activates RESET.
Q2	CE control	When turned OFF, 5V is applied to CE.
Q3	M type frequency span switching	When ON, the step is set to 50kHz with FM and 9kHz with AM.
Q4	UP LED control	When ON, the UP LED is illuminated.
Q5	DOWN LED control	When ON, the DOWN LED is illuminated.
Q6	S meter center grid control	When ON, 5V is applied to the S meter center grid.
Q7	T meter right grid control	When ON, 5V is applied to the T meter right side grid.
Q8	T meter left grid control	When ON, 5V is applied to the T meter left side grid.
Q9	Q6 control	When ON, controls Q6.
Q10	TS meter, ST, BIL. 1st/2nd/6th grid and permanent ON control	When ON, 5V is applied to the emitters of Q6, Q7, Q8, Q16 and Q17, to grids Nos. 1, 2 and 6, and to permanent ON.
Q11	Q10 control	When ON, controls Q10.
Q12	SENS LEVEL LED control	When ON, the HIGH LED is illuminated.
Q13	ACTIVE RECEPTION LED control	When ON, the ACTIVE RECEPTION LED is illuminated.
Q16	STEREO indicator control	When ON, the STEREO indicator is illuminated.

CIRCUIT DESCRIPTION

Noise detector and electric field strength detector circuits

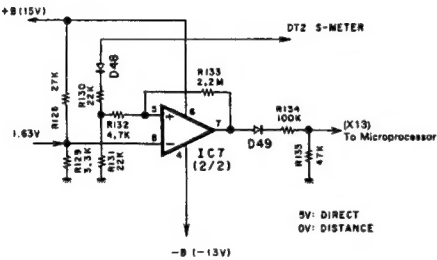
1. Noise detector

This circuit detects the presence/absence of interference from adjacent stations, etc., and applies the microprocessor with the Noise present (5V) or absent (0V) signal. The detection output is extracted from AF OUT of IC5 (LA1231N) in the daughter (2), and only the noise component is amplified by 120kHz (center frequency) tuning amp IC6 (BA401). The output is regulated by D50 and D51, and the comparator in IC7 outputs "H" = 14V ("L": -12V) when the noise DC voltage attains about 1.4V. This output is 5V/0V converted by D52, R127 and R128, and applied to the microprocessor port.



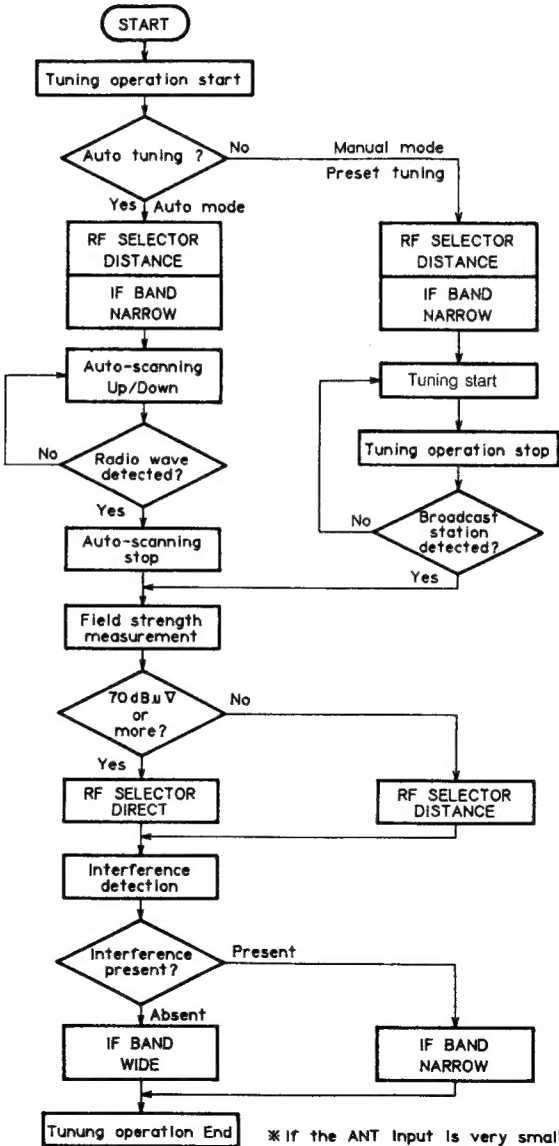
2. Field strength detector

The S meter voltage from IC5 (LA1231N) in DT2 is detected and, when the field strength exceeds 70 dB with respect to the ANT input voltage, the IC7 output goes "H" = 14V. This is 5V/0V converted and supplied to the microprocessor.



CIRCUIT DESCRIPTION

Active Reception Circuit

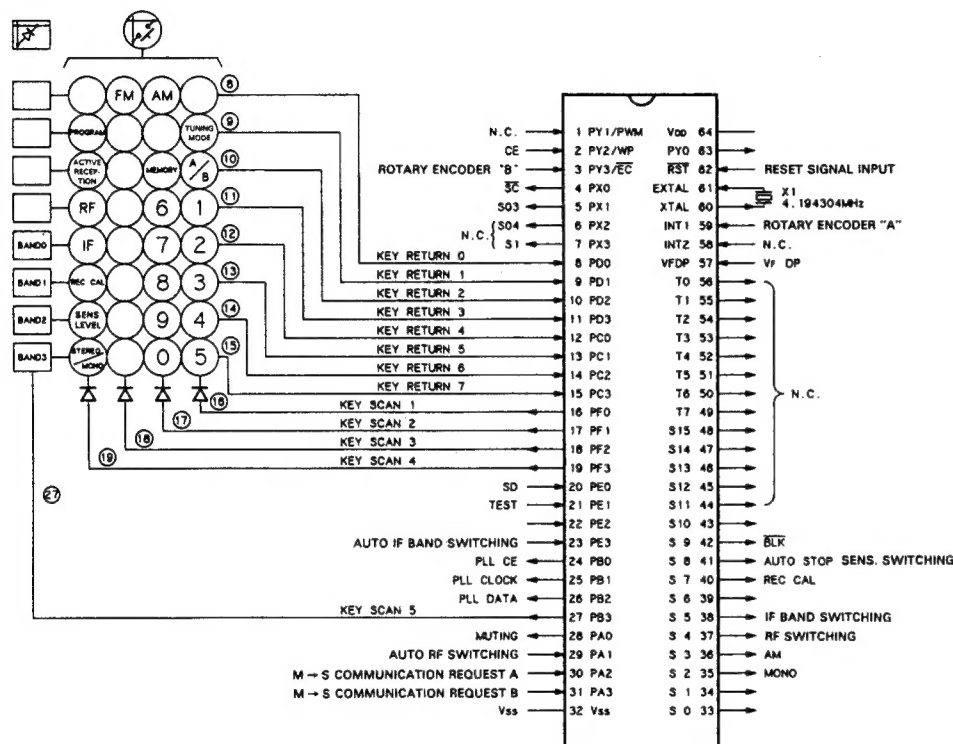


※ If the ANT Input is very small (less than 10dBμF) the Forced Narrow mode is activated regardless of the presence or absence of interference.

## CIRCUIT DESCRIPTION

IC2: CXP5016-216S (X13-633)  
Microprocessor IC

Terminal connection diagram & keymatrix connection



## Functions of diodes and switches

Destination Type	Band Set Switches B3 B2 B1 B0	Band	Receiving Frequency Range	Inter-Channel Space	Intermediate Frequency	PLL IC1 (LM7001)					Auto Tuning
						PLL Reference Frequency	PLL Input Terminal	PLL Output			
								B01 (P7)	B02 (P8)	B03 (P9)	
J	0 0 0 0	FM	76.0MHz ~ 90.0MHz	100kHz	-10.75MHz	25kHz	FMIN 1/2 prescaler outside	L	L	H	○
		AM	531kHz ~ 1602kHz	9kHz	+450kHz	9kHz	AMIN	*			○
K	1 0 0 0	FM	87.5MHz ~ 108.0MHz	100kHz	+10.7MHz	50kHz	FMIN	L	L	H	○
		AM	530kHz ~ 1610kHz	10kHz	+450kHz	10kHz	AMIN	*			○
E	1 1 1 1	FM	87.5MHz ~ 108.0MHz	50kHz	+10.7MHz	50kHz	FMIN	L	*	H	○
		AM	531kHz ~ 1602kHz	9kHz	+450kHz	9kHz	AMIN	*			○

0: Without diode 1: With diode

\*: AM is controlled by the microprocessor IC (IC2) in the (X13-) unit.

## CIRCUIT DESCRIPTION

## Port allocation

Terminal No.	Symbol	I/O	H/L	Name	Function
1	PY1/PWM	O	H	N.C.	On the PC board, shall be ready for being pulled up with a resistor.
2	PY2/WP	I	H	C.E.	Backup (AC OFF) detection terminal. H: AC ON, L: AC OFF. When the "L" level is detected, the backup status is set and clock is stopped. (Note) The rise from "L" to "H" shall be faster than the rise of the reset signal.
3	PY3/EC	I	H	ROTARY ENCODER "B"	Rotary encoder output signal input. H: ON, L: OFF.
4	PX0	O	H	SC	Serial shift clock output. H: Normal.
5	PX1	O	H	SO3	Serial display data output.
6	PX2	O	-	SO4	N.C.
7	PX3	O	-	SI	
8~15	PD0~PD3 PC0~PC3	I	H	KEY RETURN 0~7	Key return inputs. H: Input present, L: Input absent. All terminals are pulled down (by 10K to 100K).
16~19	PF0~PF3	O	H	KEY SCAN 1~4	Key scanning signals.
20	PE0	I	H	SD	Auto-tuning stop display input. H: TUNE, L: SIGNAL.
21	PE1	I	L	TEST	Test mode setting input. H: Normal, L: Test. Normally pulled up. When testing is required, the TEST terminal is connected to GND.
22	PE2			NC	NC
23	PE3	I	H/L	AUTO IF BAND	IF band switch input signal for AUTO RF/IF switching mode. H: Narrow, L: Wide.
24	PB0	O	H	PLL C.E.	Chip Enable output for PLL IC. Connected to pin 3 CL of LM7001.
25	PB1	O	H	PLL CLOCK	Clock output for PLL IC. Connected to pin 4 CL of LM7001.
26	PB2	O	H	PLL DATA	Data output for PLL IC. Connected to pin 5 DATA of LM7001.
27	PB3	O	H	KEY SCAN5	Key scanning signal.
28	PA0	O	L	MUTING	Muting control terminal. H: Muting ON, L: Muting OFF. Conditions for Muting ON: 1) when Power is turned ON/OFF, 2) when the band is switched, 3) during recalling a preset CH, 4) during manual tuning, 5) during auto tuning, 6) during IF band switching, 7) during RF switching, 8) during REC CAL ON/OFF switching.
29	PA1	I	H/L	AUTO RF switching	RF switching signal input in AUTO RF/IF switching mode. H: Direct, L: Distance.
30	PA2	O	H	M → S communication request	Data transfer request signal output for M → S display. H: Communication request, L: Normal.
31	PA3				
32	Vss	-	-	Vss	
33	S0	-	-		NC
34	S1	-	-		NC
35	S2	O	H/L	MONO/ST	FM Mono/Stereo reception control output. H: Mono, L: Stereo.
36	S3	O	H	AM	AM pack power control output. H: Power ON, L: Power OFF.
37	S4	O	H	RF SELECTOR	RF switching signal output. H: Distance, L: Direct. Fixed at Distance (H) in other reception modes than FM.

## CIRCUIT DESCRIPTION

Terminal No.	Symbol	I/O	H/L	Name	Function
38	S5	O	H/L	FM IF BAND	IF band switching signal output. H: Wide, L: Narrow. Fixed at Wide in other reception modes than FM.
39	S6			NC	
40	S7	O	H	REC CAL	REC CAL reference signal transmission request signal output. H: REC CAL reference signal transmission request, L: Normal.
41	S8	O	H/L	AUTO STOP SENS. LEVEL	Auto tuning stop sensitivity switching signal output. H: High, L: Low.
42	S9	O	H	BLK	Control signal output of pin 6 BLK of FL driver IC (LC7570). H: FL display ON, L: FL display OFF.
43~56	S10~S15 T7~T0	O	H		N.C. Only pin 56 shall be set ready for being pulled up.
57	V <sub>FB</sub>	—	—		FL-B power supply connection.
58	INT <sub>2</sub>	I	H		N.C.
59	INT <sub>1</sub>	I	H	ROTARY ENCODER "A"	Rotary encoder output signal input. H: ON, L: OFF.
60	XTAL	—	—	CL1	Clock oscillation terminals. X'tal: 4.194304 MHz.
61	EXTAL	—	—	CL2	
62	RST	I	L	RESET	Reset signal input. H: Normal, L: Reset.
63	PYD	O	—		N.C. On the PC board, shall be set ready for being pulled up.
64	V <sub>DD</sub>	—	—	V <sub>DD</sub>	+B terminal (5V).

### Preset channel memory

- When the MEMORY key is held depressed for more than 0.2 second then the key is released, preset channel display "—" blinks for about 5 seconds. In this period, select A/B and press a numeric key (1 to 0); the preset channel memory is stored and the stored channel is displayed.
- When the MEMORY key is pressed again while "—" is blinking, the display remains the same, but the unit gets ready for another preset channel memory for another 5 seconds. If nothing is done after the key has been pressed, the preset channel memory becomes impossible in about 5 seconds; the preset channel display returns to the last channel display, and the MEMORY indicator goes off.
- When an operation which is accompanied by muting is activated while "—" is blinking, the preset channel memory mode is canceled immediately. This occurs when one of the RF, IF, AUTO TUNING SYSTEM, REC CAL, FM and AM keys is pressed or when the rotary encoder is rotated. However, if the blinking of "—" was started during the AUTO TUNING SYSTEM operation, the preset channel memory mode is not canceled even when the AUTO TUNING SYSTEM key is pressed.
- The MEMORY key is not accepted while the muting timer is activated.
- The MEMORY indicator lights while the key is pressed. When the key is held depressed for more than 0.2 second, the indicator continues to light even after the key has been released and, at this time, "—" on the preset channel display starts blinking.

### Programming feature

- Last Ch → Last Ch band
  - A: Ch0 of A → Ch0 of B
  - B: Ch0 of B → Ch0 of A

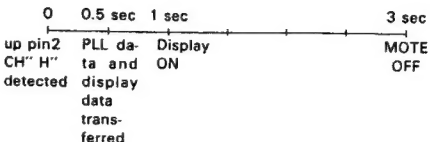
### REC CAL

- During REC CAL operation, keys other than the REC CAL key are not accepted.
- The REC CAL operation is canceled by turning power OFF (when the microprocessor is reset).
- The preset channel memory mode is canceled when the REC CAL key is pressed.
- When the REC CAL key is pressed during frequency scanning in the Auto Tuning mode, the frequency scanning pauses temporarily. The frequency scanning resumes when the REC CAL mode is canceled by pressing the REC CAL key again.
- When the REC CAL key is pressed during the AUTO TUNING SYSTEM operation, the AUTO TUNING SYSTEM operation will be carried out until the end.

## CIRCUIT DESCRIPTION

Keys valid only with FM band:  
AUTO TUNING SYSTEM, RF, IF

Display and muting OFF timing at power ON (Resetting)



### Countermeasure against overrun

- Turn power ON with the FM, RF and REC CAL keys held depressed simultaneously. The microprocessor will be initialized and data including backup data is cleared.

### Other

- Band preset scanning is possible in Test mode; when the key for the same band is pressed successively, the preset memory channels for the band are received in sequence.

### Initial setup condition

Band: FM  
Frequency: 87.50MHz  
Tuning mode: Auto  
RF: Distance  
IF: Wide  
Channel mode: A  
ST/MONO: Stereo  
Preset channel:



SENS LEVEL: "H" (all types).  
REC CAL: OFF  
PROGRAM: OFF  
AUTO TUNING SYSTEM: OFF  
Preset channel memory: FM 87.50 MHz for all of CH1 to CH0.

### AM initial setup condition

Frequency: 530 (531 kHz E-TYPE) kHz  
RF: Direct. However, all indicators including RF SEL are OFF.  
IF: Wide. However, all indicators including IF BAND are OFF.  
Channel mode: A  
ST/MONO: Mono regardless of tuning mode  
Preset channel:



SENS LEVEL: "H" (all types).  
REC CAL, PROGRAM, AUTO TUNING SYSTEM: OFF



## CIRCUIT DESCRIPTION

Output Port Logic in Different Modes

MODE		MONAURAL ⑤	AM POWER ⑥	RF ⑦	IF ⑧	SENS ⑨
At initial resetting (when backup is NG) (FM Mode)		L	L	H	H	H
FM	AUTO	H/L	L	H/L	H/L	H/L
	MANUAL	H/L	L	H/L	H/L	H/L
AM		H	H	L	H	H/L

H: HIGH  
 L: LOW  
 H: MONAURAL  
 L: STEREO  
 H: AM POWER ON  
 L: AM POWER OFF  
 H: DISTANCE  
 L: DIRECT  
 H: WIDE  
 L: NARROW  
 H: SENS H (LED is illuminated)  
 L: SENS L

## Auto tuning system (ATS)

- The ATS operation mode can be turned ON/OFF only during FM band reception.
  - When the RF or IF key is pressed during FM band reception, the ATS mode is canceled immediately. If the ATS operation has been activated, it is also aborted at this time.
  - As the final ATS operation mode is stored in memory, the ATS operation is started if the final mode was the ATS mode when the microprocessor is reset, power is turned ON, or when any of the FM band key, numeric keys or A/B key is pressed during receiving a band other than FM.
  - When the rotary encoder is rotated in the ATS mode or when the ATS key is pressed during tuning (frequency scanning) operation, RF is set to the Distance and IF to Narrow.
- However, if SD (microprocessor pin 20) "H" is not detected as the result of frequency scanning, the RF and IF mode will not change even after the end of frequency scanning.
- Even when the reception status changes after the ATS operation has ended, the ATS operation will not resume.

## Test Frequencies that are stored in memory channels in test mode

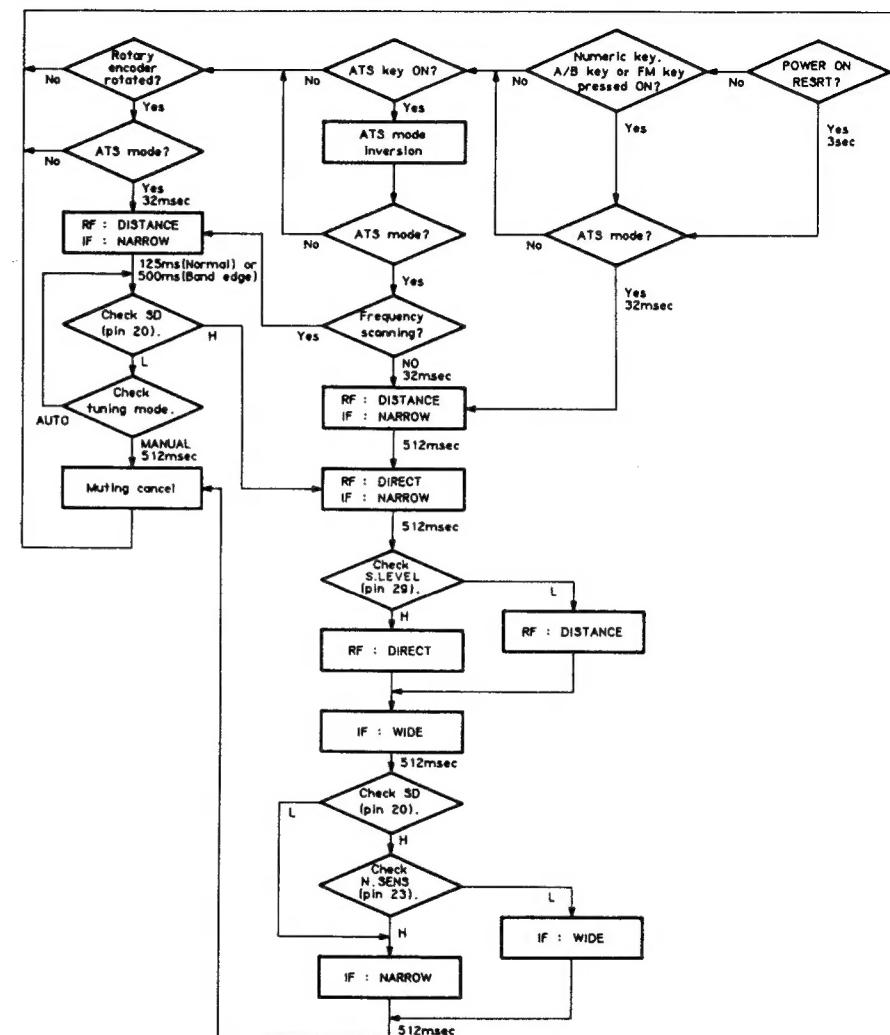
- Band preset scanning is possible only in Test mode.

TYPE CHANNEL	K	E
A-1	FM 87.5MHz	FM 87.5MHz
A-2	89.1MHz	89.1 MHz
A-3	98.0MHz	98.0 MHz
A-4	106.0MHz	106.0 MHz
A-5	108.0MHz	108.0 MHz
A-6	87.5MHz	87.5 MHz
A-7	87.5MHz	87.5 MHz
A-8	87.5MHz	87.5 MHz
A-9	87.5MHz	87.5 MHz
A-0	87.5MHz	87.5 MHz
B-1	AM 530 kHz	AM 531 kHz
B-2	630 kHz	630 kHz
B-3	990 kHz	990 kHz
B-4	1440 kHz	1440 kHz
B-5	1610 kHz	1602 kHz
B-6	FM 87.5MHz	FM 87.5MHz
B-7	87.5MHz	87.5 MHz
B-8	87.5MHz	87.5 MHz
B-9	87.5MHz	87.5 MHz
B-0	87.5MHz	87.5 MHz

Note) The Test mode is entered by turning power ON with the TEST terminal set to 0V (GND). As the band preset scanning is activated in Test mode, these frequencies can be received in sequence with out pressing the memory channel keys, but by just pressing one of the band switches (FM /AM).

## CIRCUIT DESCRIPTION

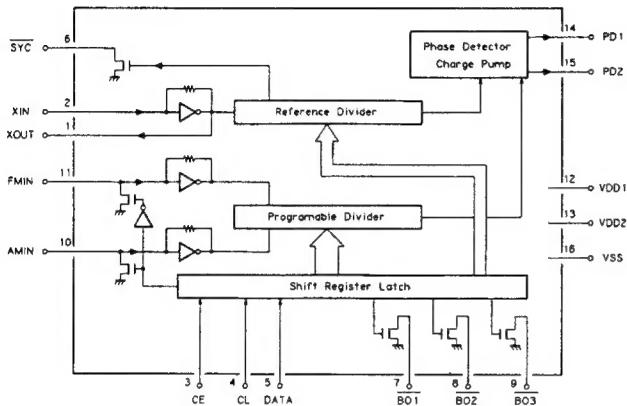
Auto tuning system operation flowchart



CIRCUIT DESCRIPTION

IC1: LM7001 (X05-342)  
PLL frequency synthesizer

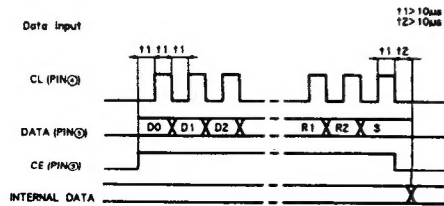
Block diagram



Terminal description

Pin no.	Pin name	I/O	Function
1	XOUT	O	Crystal oscillator (7.2 MHz).
2	XIN	I	
3	CE	I	Data input.
4	CL	I	
5	DATA	I	
6	SYC	I/O	Clock for controller (400 kHz).
7	BO1	O	Band data output.
8	BO2	O	BO1 can be used as a time base output (8 Hz)
9	BO3	O	
10	AMIN	I	Local oscillator signal input.
11	FMIN	I	
12	VDD1		Power supply.
13	VDD2		VDD2 for back-up.
14	PDD1	O	Charge pump output.
15	PD2	O	
16	VSS		Power supply.

Data input



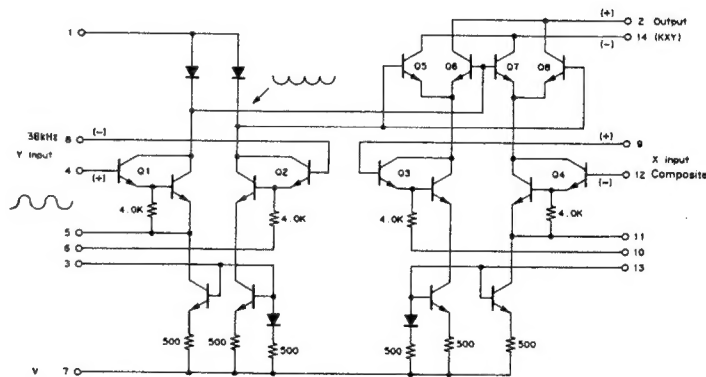
CIRCUIT DESCRIPTION

IC18: MC1495L (X05-342)  
MPX SUB demodulator

The Direct Pure MPX enables stereo decoding without causing beat interference, in theory, by linear-multiplying two analog signals (stereo composite signal and 38 kHz sine wave sub carrier signal).

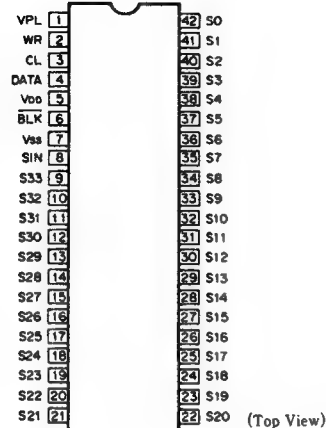
This unit provides the linear multiplier with high S/N ratio, which is designed with the new theory, so that the high signal-to-noise ratio of 94 dB for the MPX unit itself and the resistance to overmodulation of 400% (dynamic range: 106 dB) are realized while the conventional characteristics are maintained.

Internal equivalent circuit

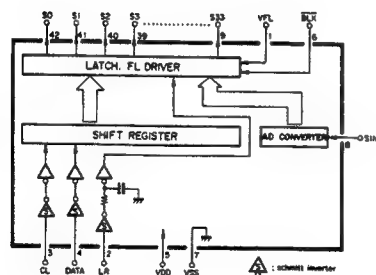


IC3, 4: LC7570 (X13-633)  
FL driver IC

### Pin configuration



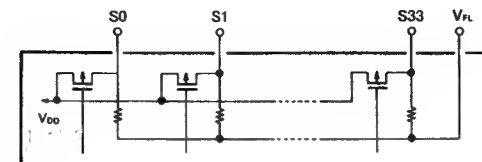
**Equivalent block diagram**



### CIRCUIT DESCRIPTION

### Explanation of terminals

S0~S33, V<sub>H</sub>: Segment outputs, pull-down resistor common terminal.

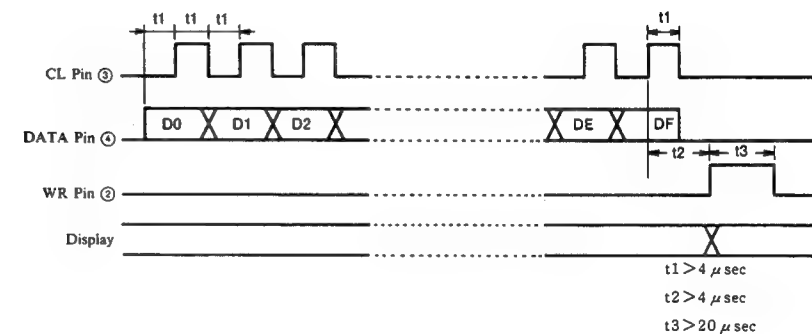


BLK : Display OFF input.  
 BLK = "0" (V<sub>ss</sub>) ..... OFF  
 BLK = "1" (V<sub>DD</sub>) ..... ON

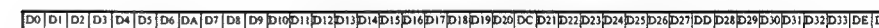
CL, DATA, WR : Data inputs

V<sub>DD</sub>, V<sub>SS</sub> : Power supply terminals

### Data input



**Input at D0**



D0~D33 : Display data  
DA~DE : Dummy bit (don't care)  
DF : S29~S33 switching

$D_n = "1" : S_n = "1" (=V_{00})$   
 $D_n = "0" : S_n = "0" (=V_{n1})$   
 $D_F = "0" : D_{29} \sim D_{33} \rightarrow S_{29} \sim S_{33}$   
 $D_F = "1" : AD1 \rightarrow S_{33}$   
 $AD2 \rightarrow S_{32}$   
 $AD3 \rightarrow S_{31}$   
 $AD4 \rightarrow S_{30}$   
 $AD5 \rightarrow S_{29}$

SIN: AD converter input.  
1st point lighting level: 0.1  $V_{DD}$  (typical)  
2nd point lighting level: 0.2  $V_{DD}$  (typical)  
3rd point lighting level: 0.3  $V_{DD}$  (typical)  
4th point lighting level: 0.4  $V_{DD}$  (typical)  
5th point lighting level: 0.5  $V_{DD}$  (typical)

# ADJUSTMENT

No.	ITEM	INPUT SETTINGS	OUTPUT SETTINGS	TUNER SETTINGS	ALIGNMENT POINTS	ALIGN FOR	FIG.
<b>F M SECTION</b> Unless otherwise specified, the individual switches should be set as following: SELECTOR:FM IF BAND:WIDE MF SELECTOR:DISTANCE TUNING MODE:AUTO REC CAL:OFF PROGRAM:OFF							
1	BAND EDGE (1)	—	Connect a DC voltmeter between TP3(VT) and TP4(GND).	TUNING MODE: MANU 87.5MHz	L14 (X05-)	3.0V	(a)
2	BAND EDGE (2)	—	Connect a DC voltmeter between TP3(VT) and TP4(GND).	TUNING MODE: MANU 108.0MHz	TC1 (X05-)	25.0V	(a)
Repeat alignments 1 and 2 several times.							
3	DISCRIMINATOR	(A) 98.0MHz 0 dev 100dBu(ANT input)	Connect a DC voltmeter between TP5(AFC) and TP6(VREF).	98.0MHz	L9 (X06-)	0.000V±10mV	(b)
4	PLL DETECTOR	(A) 98.0MHz 0 dev 100dBu(ANT input)	Connect a DC voltmeter between TP7(VCC/2) and TP8(DET).	98.0MHz	L12 (X06-)	0.000V±20mV	(c)
5	MPX YCO	(A) 98.0MHz 0 dev 100dBu(ANT input)	Connect a frequency counter between TP19(GND) and TP20(YCO).	98.0MHz	VR3 (X05-)	19.000kHz±10Hz	(d)
6	RF ALIGNMENT	(A) 98.0MHz 1kHz,±75kHz dev	(B)	98.0MHz	★ L1,4,7,10 (X05-)	Maximum amplitude and symmetry of the oscilloscope display.	
★ Repeat the sequence from L1→L4→L7→L10→L11.....a few times.							
7	IFT(1)	(A) 98.0MHz 1kHz,±75kHz dev	(B)	98.0MHz	L17 (X05-)	Maximum amplitude and symmetry of the oscilloscope display.	
8	IFT(2)	(A) 98.0MHz 1kHz,±75kHz dev	(B)	98.0MHz	L11 (X06-)	Maximum amplitude and symmetry of the oscilloscope display.	
9	AUTO-STOP SENSITIVITY	(A) 98.0MHz SELECTOR: MAIN 1kHz,±75kHz dev 12dBu(ANT input)	—	98.0MHz	VR1 (X06-)	Position where the STEREO indicator lights when the control is rotated gradually clockwise from the most.	
10	DISTORTION(1) DET	(C) 98.0MHz SELECTOR: MONO 1kHz,±75kHz dev * 80dBu(ANT input)	(B)	98.0MHz	VR3 (X06-)	Minimum distortion.	
11	DISTORTION(2) MONO	(C) 98.0MHz SELECTOR: MONO 1kHz,±75kHz dev * 80dBu(ANT input)	(B)	98.0MHz	VR4 (X06-)	Minimum distortion.	
12	DISTORTION(3) MONO	(C) 98.0MHz SELECTOR: MONO 1kHz,±75kHz dev * 80dBu(ANT input)	(B)	98.0MHz	VR6 (X06-)	Minimum distortion.	
Adjust 10, 11 and 12 alternately a few times to minimize the MONO distortion. * E & T types: 1kHz, ±46kHz dev.							
13	DISTORTION(4) STEREO	(C) 98.0MHz SELECTOR: SUB 1kHz,±68.25kHz dev Pilot:±6.75kHz dev 80dBu(ANT input)	(B)	98.0MHz	VR7 (X06-)	Minimum distortion.	
14	DISTORTION(5) STEREO	(C) 98.0MHz SELECTOR: SUB 1kHz,±68.25kHz dev Pilot:±6.75kHz dev 80dBu(ANT input)	(B)	98.0MHz	L33 (X05-)	Minimum distortion.	
After the adjustment of 14, adjust 13 again to minimize the distortion at 1kHz.							

# ADJUSTMENT

No.	ITEM	INPUT SETTINGS	OUTPUT SETTINGS	TUNER SETTINGS	ALIGNMENT POINTS	ALIGN FOR	FIG.
15	DISTORTION(6) STEREO	(C) 98.0MHz SELECTOR: L or R 1kHz,±68.25kHz dev Pilot:±6.75kHz dev 80dBu(ANT input)	(B)	98.0MHz	VR5 (X06-)	Minimum distortion.	
15'	DISTORTION(7) STEREO NARROW (E & T types)	(C) 98.0MHz SELECTOR: L or R 1kHz,±68.25kHz dev Pilot:±6.75kHz dev 80dBu(ANT input)	(B)	98.0MHz IF BAND: NARROW	VR2 (X06-)	Minimum distortion.	
Repeat the adjustments from 10 to 15 a few times to minimize the distortion.							
16	SEPARATION (1) R→L	(C) 98.0MHz SELECTOR: R 1kHz,±68.25kHz dev Pilot:±6.75kHz dev 80dBu(ANT input)	(B)	98.0MHz	VR4 (X05-)	Minimum crosstalk.	
17	SEPARATION (2) L→R	(C) 98.0MHz SELECTOR: L 1kHz,±68.25kHz dev Pilot:±6.75kHz dev 80dBu(ANT input)	(B)	98.0MHz	VR5 (X05-)	Minimum crosstalk.	
Repeat the adjustments of 16 and 17 a few times so that the R-to-L and L-to-R separations are equal.							
<b>AM SECTION</b> Keep the AM loop antenna installed. SELECTOR:AM TUNING MODE:AUTO REC CAL:OFF PROGRAM:OFF							
[1]	BAND EDGE (1)	—	Connect a DC voltmeter between TP3(VT) and TP4(GND).	530kHz	L27 (X05-)	1.5V	(a)
[2]	BAND EDGE (2)	—	Connect a DC voltmeter between TP3(VT) and TP4(GND).	1610kHz	TC3 (X05-)	8.0V	(a)
Repeat alignments [1] and [2] several times.							
[3]	RF ALIGNMENT (1)	(D) ★ 630kHz 400Hz,30% mod	(B)	630kHz	L26 (X05-)	Maximum amplitude and symmetry of the oscilloscope display.	
[4]	RF ALIGNMENT (2)	(D) ★ 1440kHz 400Hz,30% mod	(B)	1440kHz	TC2 (X05-)	Maximum amplitude and symmetry of the oscilloscope display.	
Repeat alignments [3] and [4] several times.							
[5]	IFT	(D) ★ 999kHz 400Hz,30% mod	(B)	999kHz	◆ L28 (X05-)	Maximum amplitude and symmetry of the oscilloscope display.	
◆ L28 has been preset so the adjustment is usually not required. ★ The peak will be easier to locate if the test loop antenna is used.							

## REGLAGE

N°	ITEM	REGLAGE DE L'ENTREE	REGLAGE DE LA SORTIE	REGLAGE DU TUNER	POINT DE L'ALIGNEMENT	ALIGNER POUR	FIG
SECTION MF Sauf en cas d'indications spéciales, régler chaque commutateur comme suit: SELECTOR: FM IF BAND: WIDE RF SELECTOR: DISTANCE TUNING MODE: AUTO REC CAL: OFF PROGRAM: OFF							
1	BORD DE BANDE (1)	—	Connecter un voltmètre CC entre les TP3(VT) et 4(GND).	TUNING MODE: MANU 87.5MHz	L14 (X05-)	2.0V	(a)
2	BORD DE BANDE (2)	—	Connecter un voltmètre CC entre les TP3(VT) et 4(GND).	TUNING MODE: MANU 108.0MHz	TC1 (X05-)	25.0V	(a)
Répéter les points 1 et 2 plusieurs fois.							
3	DISCRIMINATEUR	(A) 98.0MHz 0dev 100dBμ (Entrée ANT)	Connecter un voltmètre CC entre les TP5(AFC) et 6(VREF).	98.0MHz	L9 (X06-)	0.000V±10mV	(b)
4	DETECTEUR PLL	(A) 98.0MHz 0dev 100dBμ (Entrée ANT)	Connecter un voltmètre CC entre les TP7(VCC/2) et 8(DET).	98.0MHz	L12 (X06-)	0.000V±20mV	(c)
5	MPX VCO	(A) 98.0MHz 0dev 100dBμ (Entrée ANT)	Connecter un compteur de fréquence entre les TP19(GND) et 20(VCO).	98.0MHz	VR3 (X05-)	10.000kHz±10Hz	(d)
6	ALIGNEMENT HT	(A) 98.0MHz 1kHz.±75kHz dev	(B)	98.0MHz	★ L1.4.7.10 (X05-)	Amplitude et symétrie maximale de l'affichage de l'oscilloscope.	
★ Répéter la séquence L1→L4→L7→L10→L11..... plusieurs fois.							
7	TRANSFORMATEUR FI(1)	(A) 98.0MHz 1kHz.±75kHz dev	(B)	98.0MHz	L17 (X05-)	Amplitude et symétrie maximale de l'affichage de l'oscilloscope.	
8	TRANSFORMATEUR FI(2)	(A) 98.0MHz 1kHz.±75kHz dev	(B)	98.0MHz	L11 (X06-)	Amplitude et symétrie maximale de l'affichage de l'oscilloscope.	
9	SENSIBILITE ARRET AUTOMATIQUE	(A) 98.0MHz Selection: MAIN 1kHz.±75kHz dev 12dBμ (Entrée ANT)	—	98.0MHz	VR1 (X06-)	Position où l'indicateur STEREO s'allume quand la commande est tournée graduellement dans le sens des aiguilles d'une montre à partir du réglage à fond dans le sens contraire des aiguilles d'une montre.	
10	DISTORSION (1) DET	(C) 98.0MHz Selection: MONO 1kHz.±75kHz dev * 80dBμ (Entrée ANT)	(B)	98.0MHz	VR3 (X06-)	Distorsion minimale.	
11	DISTORSION (2) MONO	(C) 98.0MHz Selection: MONO 1kHz.±75kHz dev * 80dBμ (Entrée ANT)	(B)	98.0MHz	VR4 (X06-)	Distorsion minimale.	
12	DISTORSION (3) MONO	(C) 98.0MHz Selection: MONO 1kHz.±75kHz dev * 80dBμ (Entrée ANT)	(B)	98.0MHz	VR6 (X06-)	Distorsion minimale.	
Ajuster 10, 11 et 12 alternativement plusieurs fois pour minimiser la distorsion MONO. * E et T type: 1kHz.±46kHz dev.							
13	DISTORSION (4) STEREO	(C) 98.0MHz Selection: SUB 1kHz.±68.25kHz dev Pilot: ±6.75kHz dev 80dBμ (Entrée ANT)	(B)	98.0MHz	VR7 (X06-)	Distorsion minimale.	
14	DISTORSION (5) STEREO	(C) 98.0MHz Selection: SUB 1kHz.±68.25kHz dev Pilot: ±6.75kHz dev 80dBμ (Entrée ANT)	(B)	98.0MHz	L23 (X05-)	Distorsion minimale.	
Après l'ajustement de 14, ajuster 13 à nouveau pour minimiser la distorsion à 1kHz.							

## REGLAGES

N°	ITEM	REGLAGE DE L'ENTREE	REGLAGE DE LA SORTIE	REGLAGE DU TUNER	POINT DE L'ALIGNEMENT	ALIGNER POUR	FIG
15	DISTORSION (6) STEREO	(C) 98.0MHz Selection: L ou R 1kHz.±68.25kHz dev Pilot: ±6.75kHz dev 80dBμ (Entrée ANT)	(B)	98.0MHz	VR5 (X06-)	Distorsion minimale.	
15'	DISTORSION (7) STEREO (E et T type)	(C) 98.0MHz Selection: L ou R 1kHz.±68.25kHz dev Pilot: ±6.75kHz dev 80dBμ (Entrée ANT)	(B)	98.0MHz IF BAND: NARROW	VR2 (X06-)	Distorsion minimale.	
Répéter les ajustements de 10 à 15 plusieurs fois pour minimiser la distorsion.							
16	SEPARATION (1) D→G	(C) 98.0MHz Selection: R 1kHz.±68.25kHz dev Pilot: ±6.75kHz dev 80dBμ (Entrée ANT)	(B)	98.0MHz	VR4 (X05-)	Diaphonie minimale.	
17	SEPARATION (2) G→D	(C) 98.0MHz Selection: L 1kHz.±68.25kHz dev Pilot: ±6.75kHz dev 80dBμ (Entrée ANT)	(B)	98.0MHz	VR5 (X05-)	Diaphonie minimale.	
Répéter les ajustements de 16 et 17 plusieurs fois pour que les séparations D & G et G & D soient égales.							
SECTION MA Laisser l'antenne boucle MA installée. SELECTOR: AM TUNING MODE: AUTO REC CAL: OFF PROGRAM: OFF							
[1]	BORD DE BANDE (1)	—	Connecter un voltmètre CC entre les TP3(VT) et 4(GND).	530kHz	L27 (X05-)	1.5V	(a)
[2]	BORD DE BANDE (2)	—	Connecter un voltmètre CC entre les TP3(VT) et 4(GND).	1810kHz	TC3 (X05-)	8.0V	(a)
Répéter les points [1] et [2] plusieurs fois.							
[3]	ALIGNEMENT HT (1)	(D) ★ 630kHz 400Hz.30% mod	(B)	630kHz	L26 (X05-)	Amplitude et symétrie maximale de l'affichage de l'oscilloscope.	
[4]	ALIGNEMENT HT (2)	(D) ★ 1440kHz 400Hz.30% mod	(B)	1440kHz	TC2 (X05-)	Amplitude et symétrie maximale de l'affichage de l'oscilloscope.	
Répéter les points [3] et [4] plusieurs fois.							
[5]	TRANSFORMATEUR FI	(D) ★ 999kHz 400Hz.30% mod	(B)	999kHz	◆ L28 (X05-)	Amplitude et symétrie maximale de l'affichage de l'oscilloscope.	
◆ L28 a été pré-régulé de manière à ce que l'ajustement ne soit pas normalement requis. ★ La crête sera plus facile à localiser si l'antenne à boucle test est utilisée.							

ABGLEICH

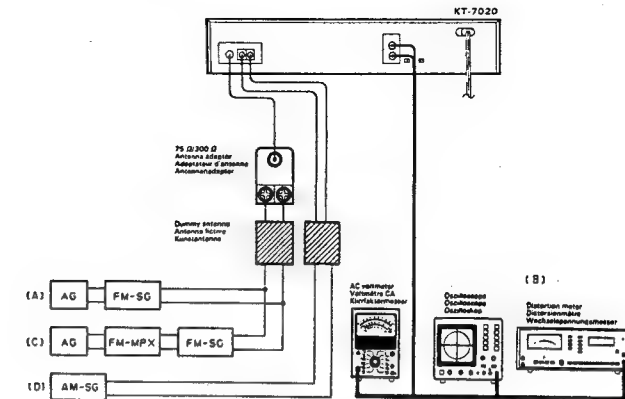
NR.	GEGENSTAND	EINGANGS-EINSTELLUNG	AUSGANGS-EINSTELLUNG	TUNER-EINSTELLUNG	ABGLEICH-PUNKTE	ABGLEICHEN FÜR	ABB.
UKW-EMPFAANGSABTEILUNG    Außer wenn anders angegeben, die verschiedenen Schalter wie folgt einstellen: SELECTOR:FM    IF BAND:WIDE    RF SELECTOR:DISTANCE    TUNING MODE:AUTO    REC CAL:OFF    PROGRAM:OFF							
1	BANDKANTE (1)	—	Einen Gleichspannungs- messer zwischen TP4(GND) und TP3(VT) anschließen.	TUNING MODE: MANU 87,5MHz	L14 (X05-)	3,0V	(a)
2	BANDKANTE (2)	—	Einen Gleichspannungs- messer zwischen TP4(GND) und TP3(VT) anschließen.	TUNING MODE: MANU 108,0MHz	TC1 (X05-)	25,0V	(a)
Abtunungen 1 und 2 mehrere Male wiederholen.							
3	DISKRIMINATOR	(A) 98,0MHz 0 Hub 100dBµ (ANT-Eingang)	Einen Gleichspannungs- messer zwischen TP5(APC) und TP6(VREF) anschließen.	98,0MHz	L9 (X06-)	0,000V±10mV	(b)
4	PLL-DETEKTOR	(A) 98,0MHz 0 Hub 100dBµ (ANT-Eingang)	Einen Gleichspannungs- messer zwischen TP7(VCC/2) und TP8(DET) anschließen.	98,0MHz	L12 (X06-)	0,000V±20mV	(c)
5	MPX VCO	(A) 98,0MHz 0 Hub 100dBµ (ANT-Eingang)	Einen Frequenzmesser zwischen TP19(GND) und TP20(VCO) anschließen.	98,0MHz	VR3 (X05-)	10,000kHz±10Hz	(d)
6	HF-ABGLEICH	(A) 98,0MHz 1kHz:±75kHz Hub	(B)	98,0MHz	★ L1, 4, 7, 10 (X05-)	Maximal Amplitude und Symmetrie des Oszilloskopbildes.	
★ Die Folge von L1→L4→L7→L10→L11...einige Male wiederholen.							
7	ZF-ÜBERTRAGER (1)	(A) 98,0MHz 1kHz:±75kHz Hub	(B)	98,0MHz	L17 (X05-)	Maximal Amplitude und Symmetrie des Oszilloskopbildes.	
8	ZF-ÜBERTRAGER (2)	(A) 98,0MHz 1kHz:±75kHz Hub	(B)	98,0MHz	L11 (X06-)	Maximal Amplitude und Symmetrie des Oszilloskopbildes.	
9	AUTOSTOP- EMPFINDLICHKEIT	(A) 98,0MHz Wähler:MAIN 1kHz:±75kHz Hub 12dBµ (ANT-Eingang)	—	98,0MHz	VR1 (X06-)	Position, wo die STEREO- Anzeige leuchtet, wenn der Regler von der Einstellung ganz entgegen dem Uhrzeiger- sinn langsam im Uhrzeiger- sinn gedreht wird.	
10	KLIRRFAKTOR (1) DET	(C) 98,0MHz Wähler:MONO 1kHz:±75kHz Hub * 80dBµ (ANT-Eingang)	(B)	98,0MHz	VR3 (X06-)	Minimal Klirrfaktor.	
11	KLIRRFAKTOR (2) MONO	(C) 98,0MHz Wähler:MONO 1kHz:±75kHz Hub * 80dBµ (ANT-Eingang)	(B)	98,0MHz	VR4 (X06-)	Minimal Klirrfaktor.	
12	KLIRRFAKTOR (3) MONO	(C) 98,0MHz Wähler:MONO 1kHz:±75kHz Hub * 80dBµ (ANT-Eingang)	(B)	98,0MHz	VR6 (X06-)	Minimal Klirrfaktor.	
10, 11 und 12 abwechselnd einige Male einstellen, um die MONO-Verzerrung zu minimieren. * E und T Typen: 1kHz: ±46kHz Hub.							
13	KLIRRFAKTOR (4) STEREO	(C) 98,0MHz Wähler:SUB 1kHz:±68,25kHz Hub Piloten: ±6,75kHz Hub 80dBµ (ANT-Eingang)	(B)	98,0MHz	VR7 (X06-)	Minimal Klirrfaktor.	
14	KLIRRFAKTOR (5) STEREO	(C) 98,0MHz Wähler:SUB 1kHz:±68,25kHz Hub Piloten: ±6,75kHz Hub 80dBµ (ANT-Eingang)	(B)	98,0MHz	L33 (X05-)	Minimal Klirrfaktor.	
Nach der Einstellung von 14 erneut 13 einstellen, um die Verzerrung bei 1kHz zu minimieren.							

ABGLEICH

NR.	GEGENSTAND	EINGANGS-EINSTELLUNG	AUSGANGS-EINSTELLUNG	TUNER-EINSTELLUNG	ABGLEICH-PUNKTE	ABGLEICHEN FÜR	ABB.
15	KLIRRFAKTOR (6) STEREO	(C) 98,0MHz Wähler:L oder R 1kHz:±68,25kHz Hub Piloten: ±6,75kHz Hub 80dBµ (ANT-Eingang)	(B)	98,0MHz	VR5 (X06-)	Minimal Klirrfaktor.	
15'	KLIRRFAKTOR (7) STEREO NARROW (E & T Typen)	(C) 98,0MHz Wähler:L oder R 1kHz:±68,25kHz Hub Piloten: ±6,75kHz Hub 80dBµ (ANT-Eingang)	(B)	98,0MHz IF BAND: NARROW	VR2 (X06-)	Minimal Klirrfaktor.	
Die Einstellungen von 10 bis 15 einige Male wiederholen, um die Verzerrung zu minimieren.							
16	STEREO KANAL TRENNUNG (1) R → L	(C) 98,0MHz Wähler:R 1kHz:±68,25kHz Hub Piloten: ±6,75kHz Hub 80dBµ (ANT-Eingang)	(B)	98,0MHz	VR4 (X05-)	Minimales Übersprechen.	
17	STEREO KANAL TRENNUNG (2) L → R	(C) 98,0MHz Wähler:L 1kHz:±68,25kHz Hub Piloten: ±6,75kHz Hub 80dBµ (ANT-Eingang)	(B)	98,0MHz	VR5 (X05-)	Minimales Übersprechen.	
Die Einstellungen von 16 und 17 einige Male wiederholen, so daß die Trennung von Rechts zu Links und von Links zu Rechts gleich ist.							
MW-EMPFAANGSABTEILUNG    Die MW-Rahmenantenne angebracht lassen. SELECTOR:AM    TUNING MODE:AUTO    REC CAL:OFF    PROGRAM:OFF							
[1]	BANDKANTE (1)	—	Einen Gleichspannungs- messer zwischen TP3(VT) und TP4(GND) anschließen.	530kHz	L27 (X05-)	1,5V	(a)
[2]	BANDKANTE (2)	—	Einen Gleichspannungs- messer zwischen TP3(VT) und TP4(GND) anschließen.	1610kHz	TC3 (X05-)	8,0V	(a)
Abtunungen [1] und [2] mehrere Male wiederholen.							
[3]	HF-ABGLEICH (1)	(D) ★ 630kHz 400Hz, 30% mod	(B)	630kHz	L26 (X05-)	Maximal Amplitude und Symmetrie des Oszilloskopbildes.	
[4]	HF-ABGLEICH (2)	(D) ★ 1440kHz 400Hz, 30% mod	(B)	1440kHz	TC2 (X05-)	Maximal Amplitude und Symmetrie des Oszilloskopbildes.	
Abtunungen [3] und [4] mehrere Male wiederholen.							
[5]	ZF-ÜBERTRAGER (D) ★	999kHz 400Hz, 30% mod	(B)	999kHz	◆ L28 (X05-)	Maximal Amplitude und Symmetrie des Oszilloskopbildes.	
◆ L28 ist ab Werk eingestellt, so daß normalerweise keine Einstellung erforderlich ist. ★ Bei Verwendung der Test-Rahmenantenne kann die Spitze leichter gefunden werden.							

# KT-7020

## ADJUSTMENT/REGLAGES/ABGLEICH



## VOLTAGE TABLES

### TUNER UNIT (X05-342X-XX)

#### IC1

1,2	1.5V
3-7	—
8	0.2V
9	1.2V
10	—
11	1.2V
12,13	5.0V
14-16	—

#### IC4

1	5.6V
2	2.1V
3	2.6V
4,5	0V
6	0.2V
7,8	0.8V
9	2.7V
10	8.2V
11	0.6V
12	0V
13	2.1V
14	11.8V
15-17	0V
18,19	5.6V
20	3.8V

#### IC5,14,17,20,21

1-3	7.3V
4	0
5-7	7.3V
8	14.5V

#### IC6

1	1.2V
2	1.3V
3	0V
4	10.8V
5	13.5V

#### IC7

1	13.8V
2	6.1V
3	4.6V
4	-13.0V
5	-0.1V
6	14.5V
7	-11.5V
8	1.6V

#### IC8

1	-11.6V
2	6.1V
3	0.1V
4	-13.0V
5,6	—
7	-11.7V
8	14.5V

#### IC9

1	13.9V
2	5.6V
3	8.5V
4	-12.9V
5	5.5V
6	6.5V
7	-11.5V
8	14.5V

#### IC15

1	2.6V
2	2.7V
3	—
4	6.7V
5	10.6V
6	12.7V
7	—
8	1.7V
9	—
10	0.9V
11	2.2V
12	2.6V
13	2.0V
14,15	2.1V
16	2.9V

#### IC16

IN	14.2V
OUT	12.6V
GND	—

#### IC18

1	0.9V
2	12.3V
3	0.8V
4	8.6V
5	7.3V
6	5.6V
7	8.7V
8	2.0V

#### IC19

1	5.6V
2,3	7.3V
4	—
5,6	7.3V
7	8.6V
8	14.5V

#### IC21

1	—
2	—
3	—
4	—
5	—
6	—
7	—
8	—

#### IC22

1	24.3V
2	15.1V
3	16.5V
4	1.8V
5	0V

#### IC23

IN	9.6V
OUT	13.8V
GND	—

#### Q1

G1	4.5V
G2	0V
D	11.3V
S	0V

#### Q2

G1	0V
G2	0V
D	12.2V
S	0V

#### Q3

G	0V
D	8.7V
S	—

#### Q4,8

Q	5V
D	2.2V
S	5V

#### Q8

G	0V
D	0V
S	0V

#### Q10

E	+B 4.5V
C	AM B 14.4V
B	—

#### Q11

E	—
C	0V
B	AM 0.6V

#### Q16

E	DIR 0V
D	DIR 4V
S	DIR 1.4V
B	—

#### Q17

E	13V
C	—
B	0.6V

#### Q18

E	+B 14.3V
C	DIS 14.1V
D	DIS 12.7V
B	—

#### Q19

E	13.0V
C	DIS 14.1V
D	DIR 12.7V
B	—

#### Q20

E	+B 14.5V
C	WIDE 14.1V
D	2.2V
S	5V

#### Q21

E	+B 14.5V
C	MAR 14.1V
D	—
B	—

#### Q22

E	14.5V
C	13.8V
B	13.8V

#### Q24

E	—
C	—
B	0.6V

#### Q25

E	—
C	13.1V
B	0V

#### Q28

E	0.1V
D	7.3V
S	7.3V

#### Q27

G	7.6V
D	7.3V
S	7.3V

#### Q28

E	—
C	—
B	0.6V

#### Q44

E	13V
C	—
B	0.6V

#### Q34

E	—
C	2.4V
S	0.1V

#### Q35

E	10.6V
D	11.3V
S	4.1V

#### Q36

G	7.1V
D	12.6V
S	7.3V

#### Q37

E	12.6V
C	2.3V
B	12.0V

#### Q38

E	12.8V
C	12.0V
B	12.0V

#### Q39

E	—
C	12.0V
B	12.0V

#### Q40

E	—
C	7.3V
B	12.0V

#### Q41

E	1.8V
C	12.0V
B	12.0V

#### Q42

E	1.6V
C	7.3V
B	12.0V

#### Q44

E	5.1V
C	—
B	5.1V

#### Q45

E	14.5V
C	22.0V
B	16.1V

#### Q46

E	-12.8V
C	-23.8V
B	-13.5V

#### Q47

E	0V
C	-13.5V
B	0.6V

#### Q48

E	27.8V
C	—
B	28.4V

#### Q49

E	5.1V
C	28.4V
B	5.7V

#### Q50

E	4.8V
C	13.0V
B	5.5V

#### Q51

E	-16.7V
C	-22.6V
B	-17.3V

#### Q52

E	4.8V
C	—
B	4.8V

#### Q54

E	-17.5V
C	DOWN: 3.6V
B	—

#### IC2

1	—
2	4.8V
3-41	—
42	LED ON: 5V
43-55	—
56	4.9V
57	—
58	4.9V
59	0V
60	1.2V
61	1.3V
62	5.0V
63	—
64	6.0V

#### IC3

1	-17.5V
2-4	—
5	5.0V
6-42	—

#### IC4

1	-17.5V
2-4	—
5	5V
6,7	—
8	NO SIGNAL 0V
9	TUNED -3.5V

#### IC5

1-3	0V
4	-16V
5	4.1V

#### Q1

E	—
C	NORMAL 5V
B	RS1 5V

#### Q2

E	4.8V
C	—
B	4.8V

#### Q3

E	-17.5V
C	DOWN: 3.6V
B	—

#### Q4

E	-17.5V
C	DOWN: 3.6V
B	—

#### Q5

E	-17.5V
C	UP 3.6V
B	—

#### Q6

E	4.7V
C	—
B	—

#### Q7

E	5V
C	5V
B	—

#### Q8

E	5V
C	5V
B	—

#### Q9

E	—
C	TUNED 0V
B	UNTUNED 5V

#### Q10

E	5V
C	5V
B	—

#### Q11

E	—
C	0
B	—

#### Q12,13

E	-17.5V
C	ON: -17.5V
B	OFF: 3.6V

#### Q16

E	4.7V
C	ON: 4.8V
B	OFF: -16V

#### Q18

E	1.2V
C	1.5V
B	—

#### Q19

E	1.2V
C	1.3V
B	—

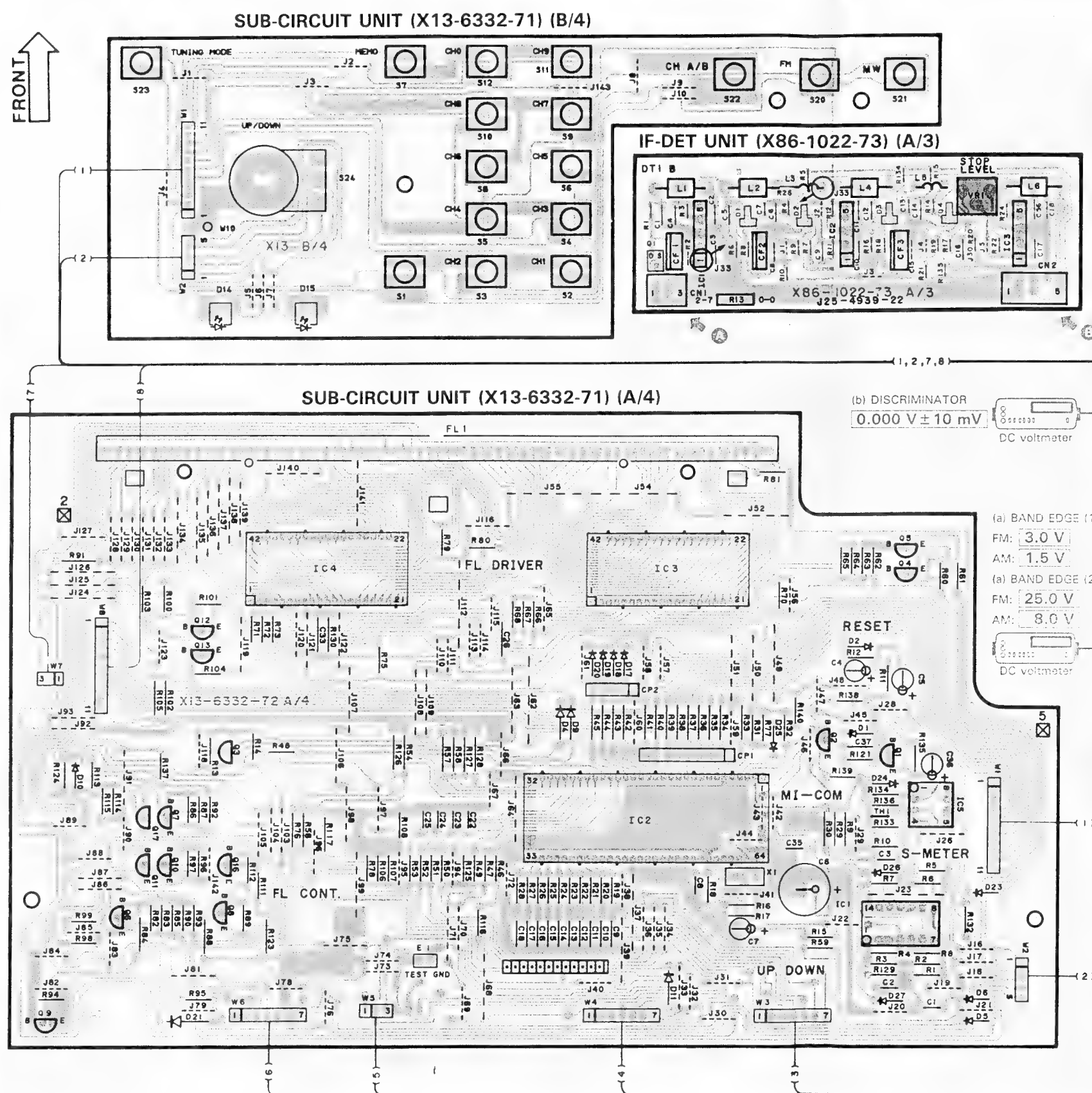
#### Q20

E	1.2V
C	1.3V
B	—

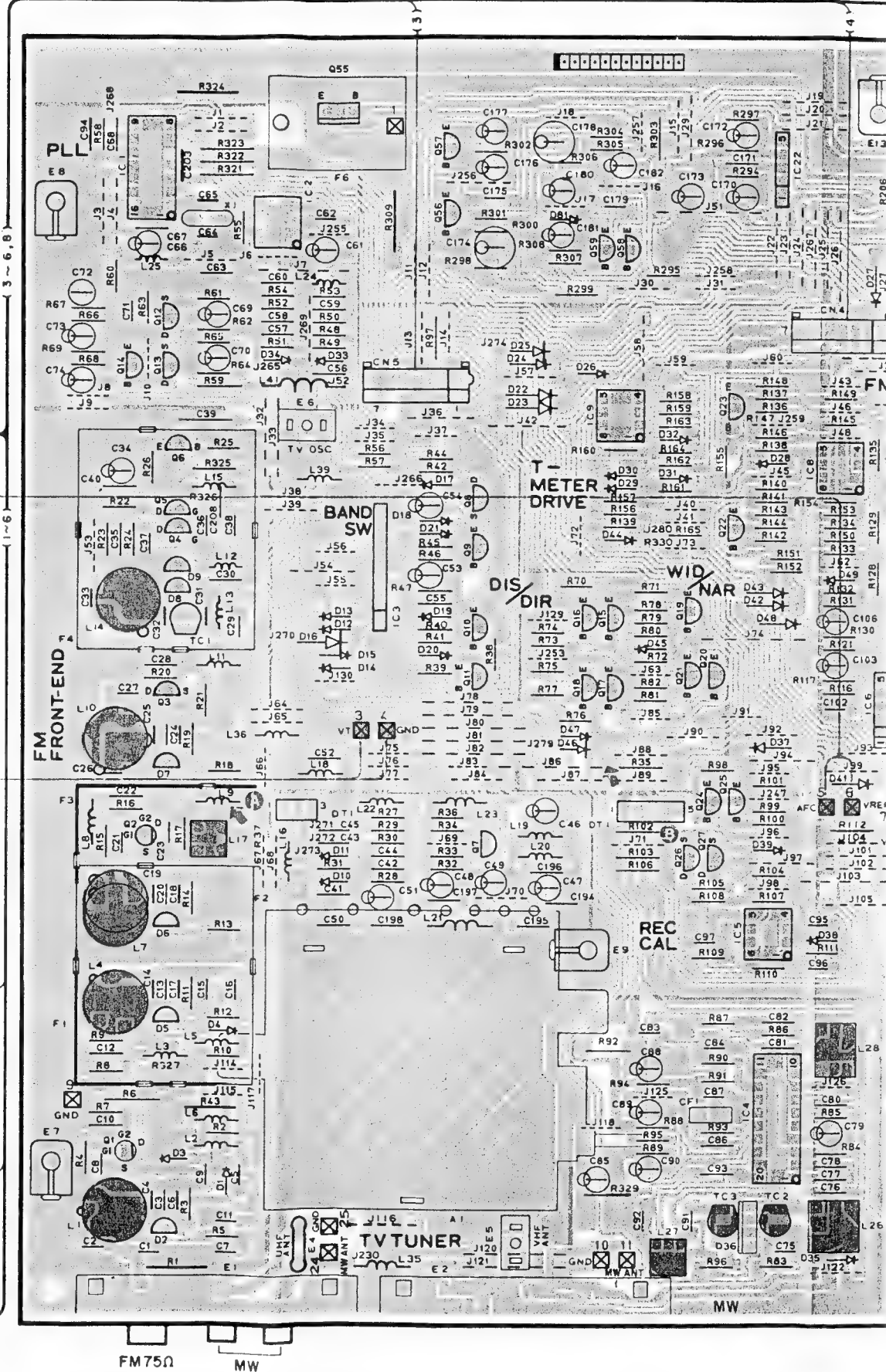
#### IC4



# PC BOARD (Component side view)



## TUNER UNIT (X05-3422-72)

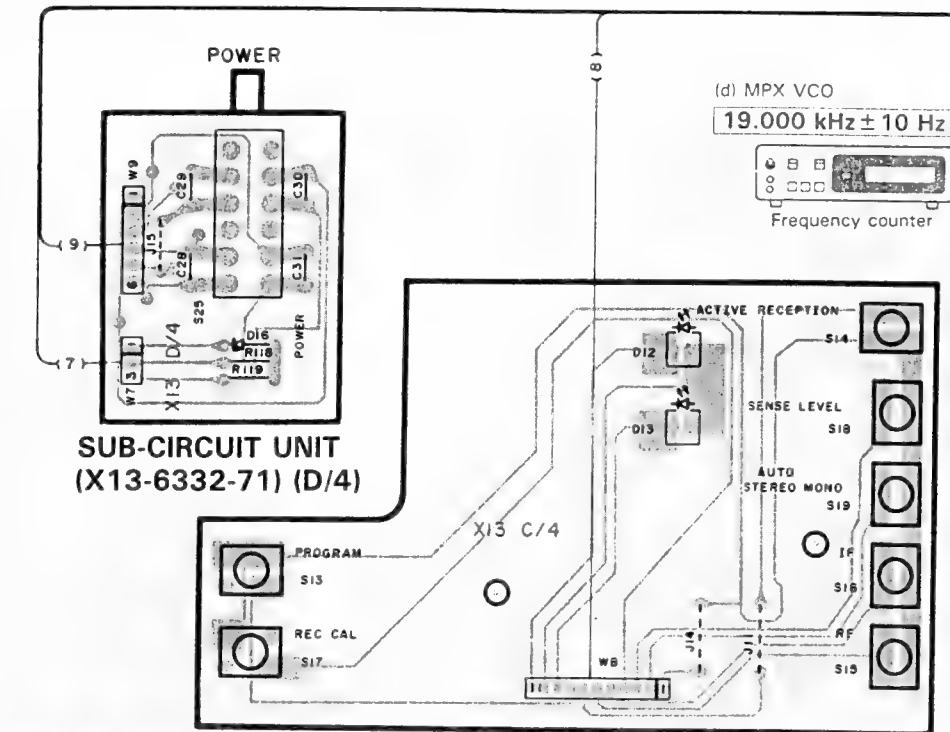




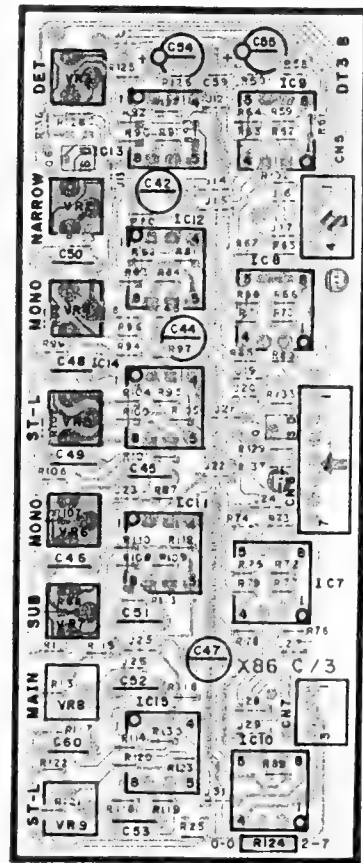




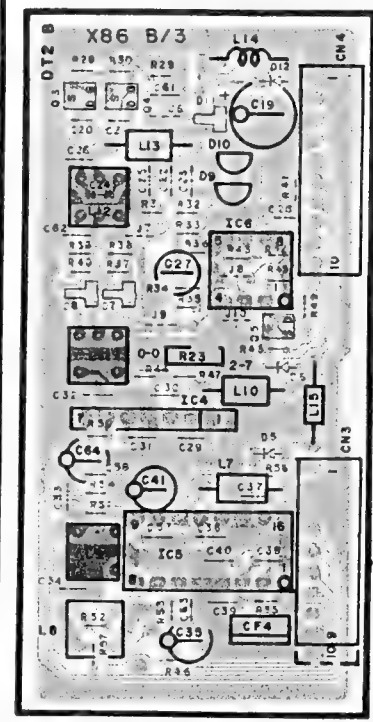
### PC BOARD (Foil side view)



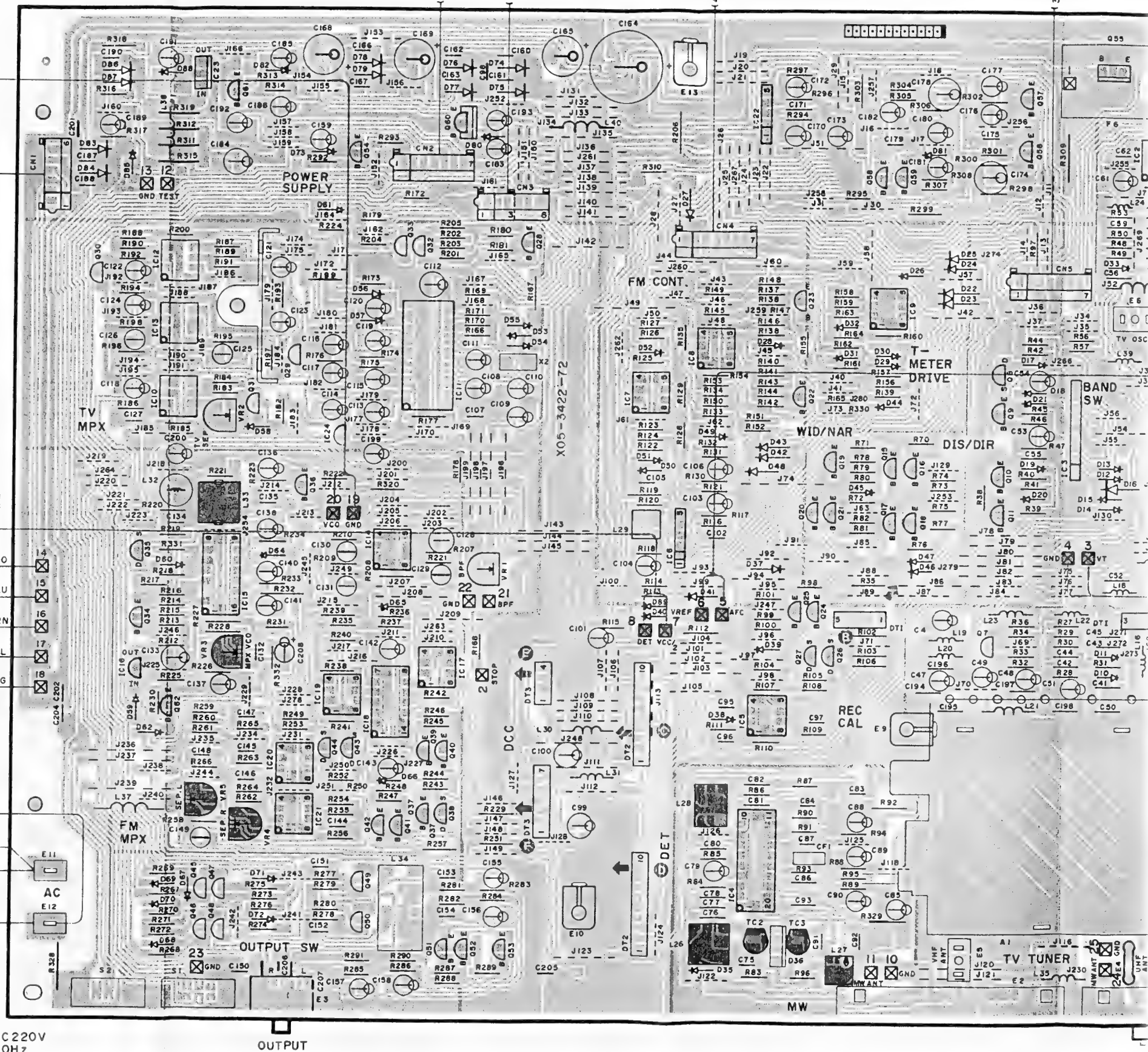
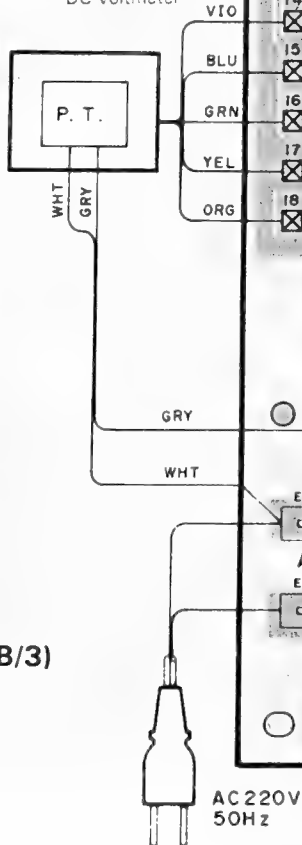
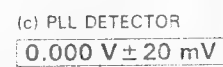
**SUB-CIRCUIT UNIT (X13-6332-71) (C/4)**



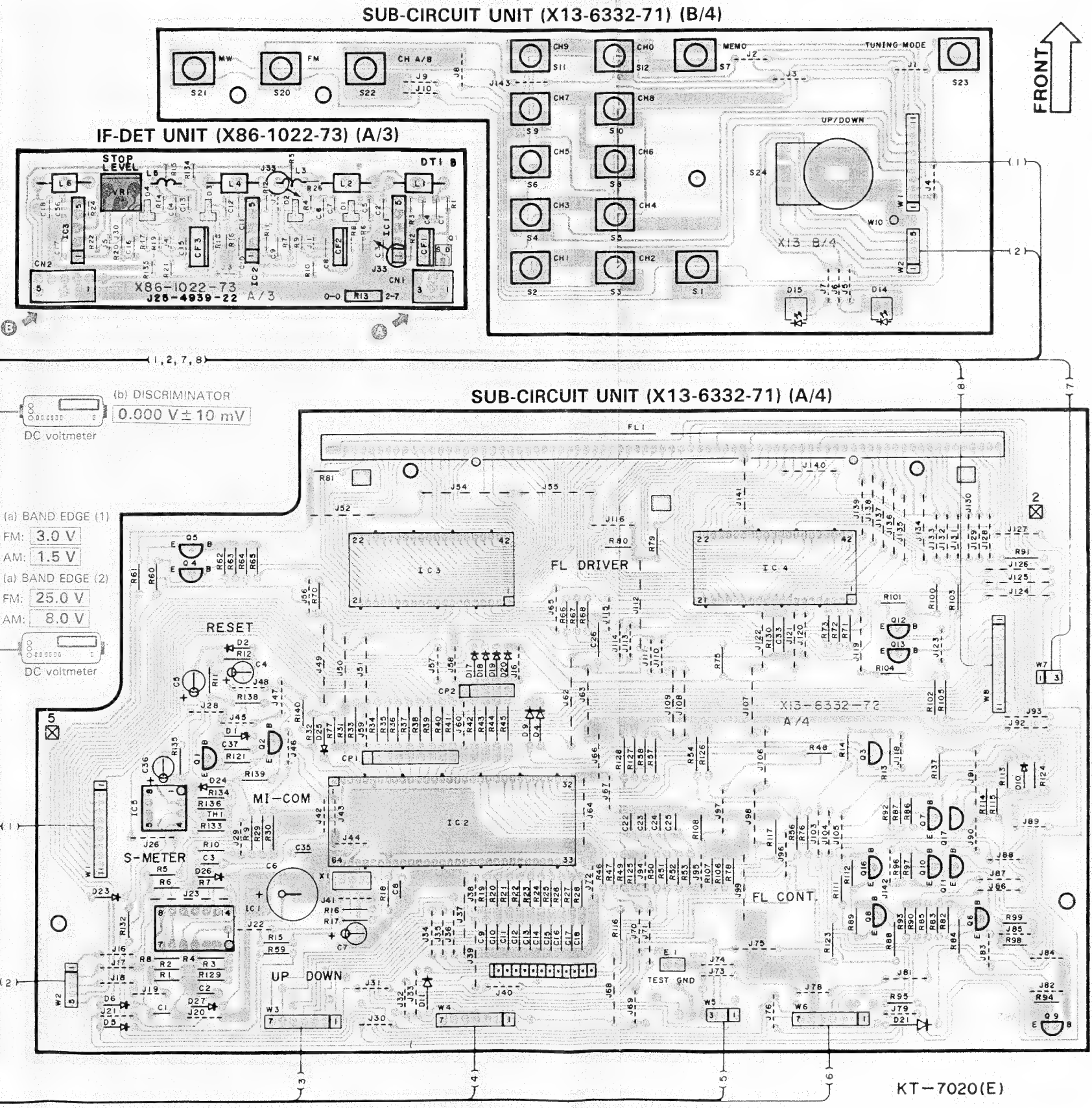
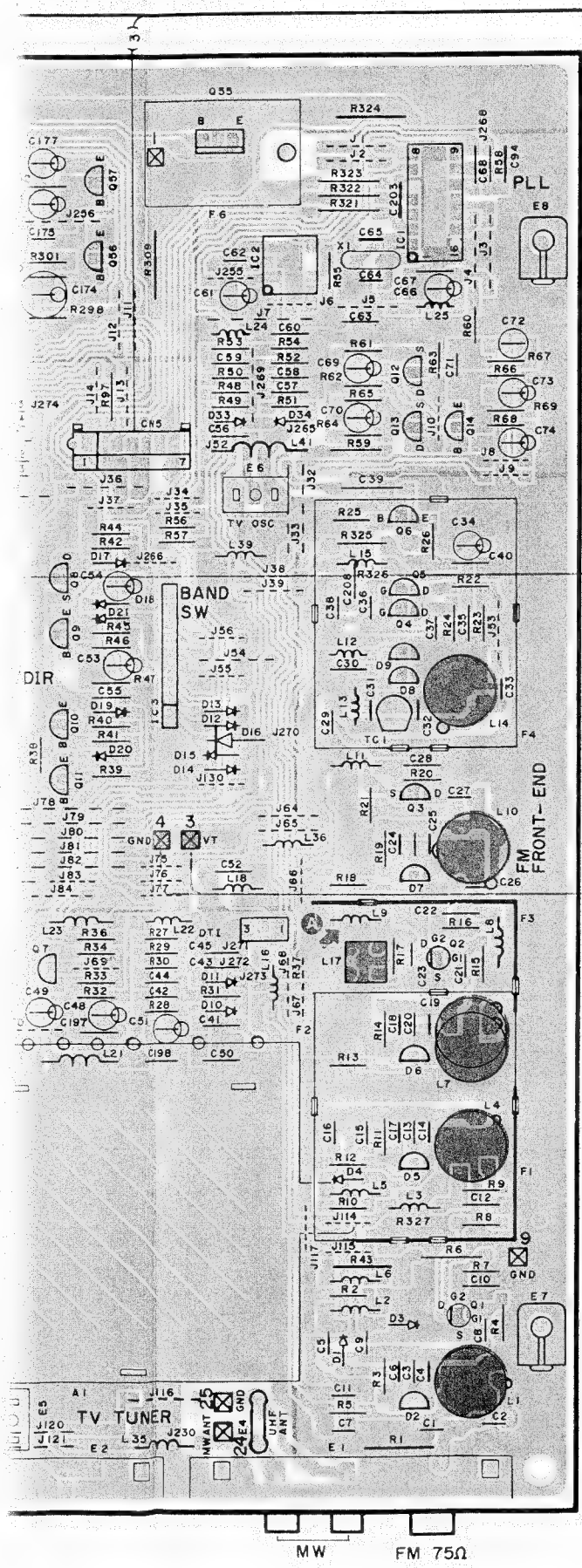
IF-DET UNIT  
(X86-1022-73) (C/3)



IF-DET UNIT (X86-1022-73) (B/3)







**TUNER UNIT (X05-342X-XX)**

Ref. No.	IC	Q	Address
1	Q	1	6AD
2	Q	2	5AD
3	Q	3	4AD
4	Q	4	3AD
5	Q	5	3AD
6	Q	6	3AD
7	Q	7	3AC
8	Q	8	3AC
9	Q	9	3AC
10	Q	10	4AC
11	Q	11	4AC
12	Q	12	2AD
13	Q	13	3AD
14	Q	14	3AD
15	Q	15	4AB
16	Q	16	4AB
17	Q	17	4AB
18	Q	18	4AB
19	Q	19	4AB
20	Q	20	4AB
21	Q	21	4AB
22	Q	22	3AB
23	Q	23	3AB
24	Q	24	4AB
25	Q	25	4AB
26	Q	26	5AB
27	Q	27	5AB
28	Q	28	2Z
29	Q	29	4X
30	Q	30	4X
31	Q	31	4Y
32	Q	32	4Y
33	Q	33	6Z
34	Q	34	6Z
35	Q	35	6Z
36	Q	36	6Z
37	Q	37	6Z
38	Q	38	6Z
39	Q	39	5Z
40	Q	40	5Z
41	Q	41	6Y
42	Q	42	6Y
43	Q	43	5Y
44	Q	44	5Y
45	Q	45	6Z
46	Q	46	6Z
47	Q	47	6Z
48	Q	48	6Z
49	Q	49	6Z
50	Q	50	2Y
51	Q	51	1AC
52	Q	52	2AC
53	Q	53	2AC
54	Q	54	2AB
55	Q	55	2AB
56	Q	56	2AB
57	Q	57	2Z
58	Q	58	2Y
59	Q	59	5X

**SUB-CIRCUIT UNIT (X13-633X-XX)**

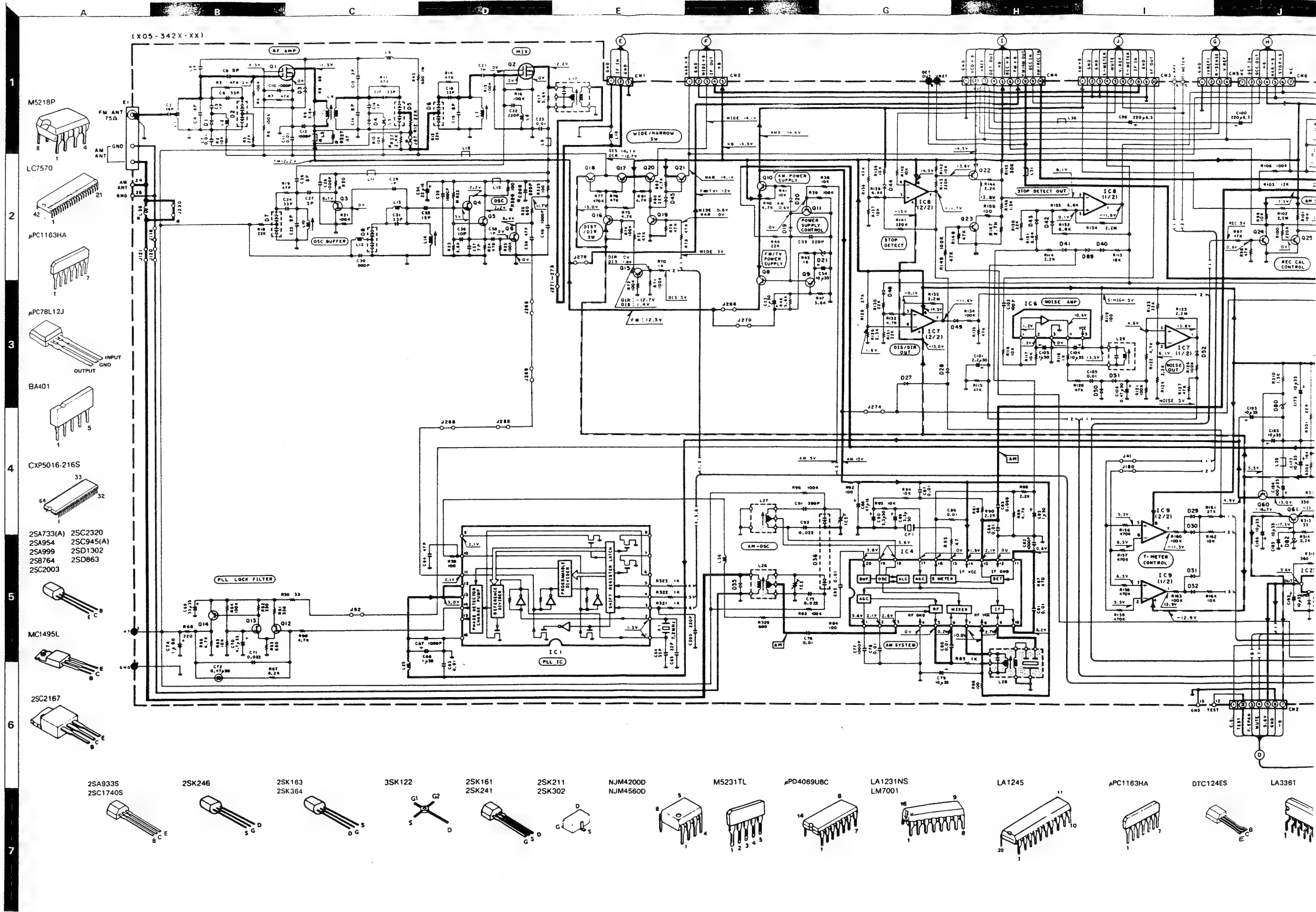
Ref. No.	IC	Q	Address
1	Q	1	5AF
2	Q	2	5AF
3	Q	3	4AF
4	Q	4	4AF
5	Q	5	4AF
6	Q	6	6AI
7	Q	7	6AI
8	Q	8	6AI
9	Q	9	6AI
10	Q	10	6AI
11	Q	11	6AI
12	Q	12	4AI
13	Q	13	4AI
14	Q	14	6AI
15	Q	15	6AF
16	Q	16	5AG
17	Q	17	4AG
18	Q	18	4AI
19	Q	19	5AE

**IF-DET UNIT (X86-102X-XX)**

Ref. No.	IC	Q	Address
1	Q	1	2AG
2	Q	2	4U
3	Q	3	4V
4	Q	4	5V
5	Q	5	4T
6	Q	6	5U
7	Q	7	2AF
8	Q	8	2AE
9	Q	9	5V
10	Q	10	6V
11	Q	11	5V
12	Q	12	4U
13	Q	13	4U
14	Q	14	5T

Ref. No.	IC	Q	Address
1	Q	1	2AD
2	Q	2	6AA
3	Q	3	5AA
4	Q	4	4AA
5	Q	5	3AA
6	Q	6	3AA
7	Q	7	3AB
8	Q	8	4Y
9	Q	9	4X
10	Q	10	5X
11	Q	11	5Z
12	Q	12	5Y
13	Q	13	5Y
14	Q	14	5Y
15	Q	15	6Y
16	Q	16	2AA
17	Q	17	1X

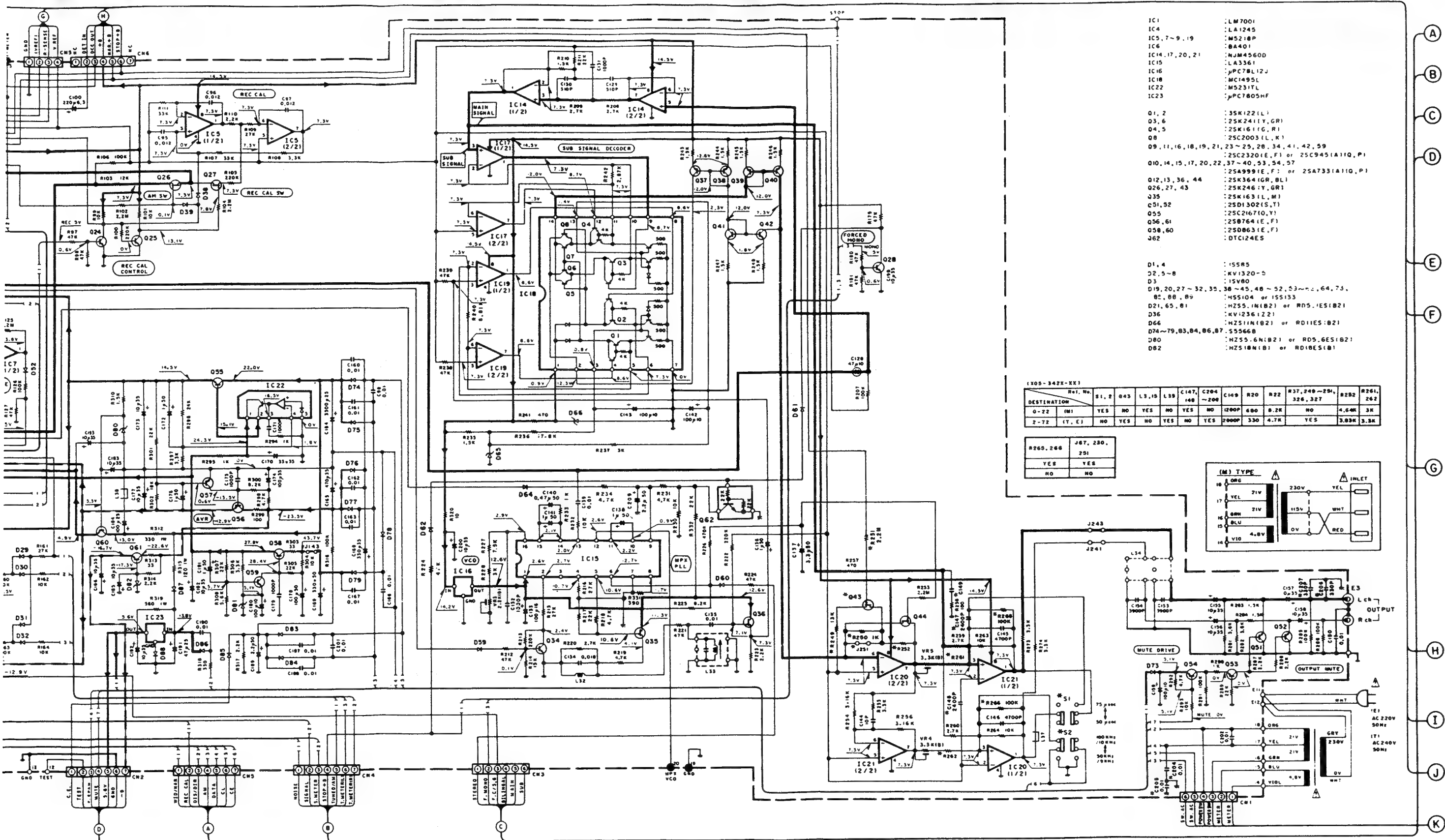
KT-7020(E)



- 1 M5218P
- 2 LC7570
- 3  $\mu$ PC1163HA
- 4  $\mu$ PC78L12J
- 5 BA401
- 6 CXP5016-216S
- 7 2SA733(A) 2SC2320
- 2SA954 2SC945(A)
- 2SA999 2SD1302
- 2SB764 2SD863
- 2SC2003
- MC1495L
- 2SC2167

- 2SA933S 2SC1740S
- 2SK246
- 2SK163 2SK364
- 3SK122
- 2SK161 2SK241
- 2SK211 2SK302
- NJM4200D NJM4560D
- M5231TL
- $\mu$ PD4069UBC
- LA1231NS LM7001
- LA1245
- $\mu$ PC1163HA
- DTC124ES
- LA3361





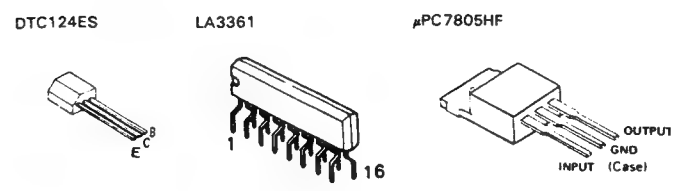
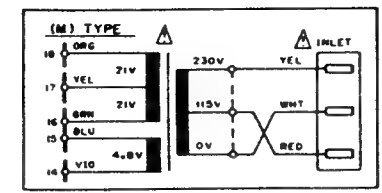
- IC1 : LM7001  
IC4 : LA1245  
IC5, 7-9, 19 : M5218P  
IC6 : BA401  
IC14, 17, 20, 21 : NJM4560D  
IC15 : LA3361  
IC16 :  $\mu$ PC7BL12J  
IC18 : MC1495L  
IC22 : M5231TL  
IC23 :  $\mu$ PC7805HF
- Q1, 2 : 3SK122(L)  
Q3, 6 : 2SK241(Y, GR)  
Q4, 5 : 2SK161(G, R)  
Q8 : 2SC2003(L, K)  
Q9, 11, 16, 18, 19, 21, 23-25, 28, 34, 41, 42, 59 : 2SC2320(E, F) or 2SC945(A11Q, P)  
Q10, 14, 15, 17, 20, 22, 37-40, 53, 54, 57 : 2SA999(E, F) or 2SA733(A11Q, P)  
Q12, 13, 36, 44 : 2SK364(IG, BL)  
Q26, 27, 43 : 2SK246(Y, GR)  
Q35 : 2SK163(L, M)  
Q51, 52 : 2SD1302(S, T)  
Q55 : 2SC2167(O, Y)  
Q56, 61 : 2S0764(E, F)  
Q58, 60 : 2SD063(E, F)  
Q62 : DTC124ES
- D1, 4 : 1SS85  
D2, 5-8 : KV1320-B  
D3 : 1SV80  
D19, 20, 27-32, 35, 38-45, 48-52, 53-54, 64, 73, 82, 88, 89 : M55104 or 1SS133  
D21, 65, 81 : MZ55.1N(B2) or RD5.1ES(B2)  
D36 : KV1236122  
D66 : MZ511N(B2) or RD11ES(B2)  
D74-79, 83, 84, 86, 87 : 555668  
D80 : MZ55.6N(B2) or RD5.6ES(B2)  
D82 : MZ518N(B1) or RD18ES(B1)

(X05-342X-XX)

DESTINATION	Rel. No.	S1, 2	Q43	L3, 15	L39	C147, 148	C204	C149	R20	R22	R37, 248-250, 326, 327	R282	R261
0-22 (IM)	YES	NO	YES	NO	YES	NO	1200P	600	8.2K	NO	4.6K	3K	
2-72 (Y, C)	NO	YES	NO	YES	NO	YES	2000P	330	4.7K	YES	3.03K	3.3K	

R260, 266 JBT, 280, 281

YES	YES
NO	NO



**CAUTION:** For continued safety, replace safety critical components only with manufacturer's recommended parts (refer to parts list). Indicates safety critical components. To reduce the risk of electric shock, leakage-current or resistance measurements shall be carried out (exposed parts are acceptably insulated from the supply circuit) before the appliance is returned to the customer.

DC voltages are as measured with a high-impedance voltmeter during reception of the FM broadcast signal (with a signal strength of 60 dB at the ANT terminal). Values may vary slightly due to variations between individual instruments or/and units. Values in parentheses are as measured during reception of the AM broadcast signal (with a signal strength of 60 dB at the ANT terminal).

Les tensions c.c. doivent être mesurées avec un voltmètre à haute impédance pendant la réception d'un

signal de programme FM (avec une force de signal de 60 dB à la borne ANT). Les valeurs peuvent différer légèrement du fait des variations inhérentes aux appareils et aux instruments de mesure individuels. Les valeurs entre parenthèses doivent être mesurées pendant la réception d'un signal de programme AM avec une force de signal de 60 dB à la borne ANT).

Die angegebenen Gleichspannungswerte wurden mit einem hochohmigen Spannungsmesser bei Empfang eines UKW-Signals (mit einer Feldstärke von 60 dB am

Antennenanschluß) gemessen. Dabei schwanken die Meßwerte aufgrund von Unterschieden zwischen einzelnen Instrumenten oder Geräten u.U. geringfügig. Die eingeklammerten Gleichspannungswerte wurden bei Empfang eines MW-Signals (mit einer Feldstärke von 60 dB am Antennenanschluß) gemessen.

KT - 7020 (E) (1/2)

Y07-3252-71

(X86-102X-XX)(A/3)

(IF AMP 2)

(IF AMP 3)

(IF AMP 4)

(IF AMP 1)

(X86-102X-XX)(A/3) (86-102X-XX)

IC2,3 : BA401

Q1 : 2SK302 (Y,GR)

D2~4 : 1SS184

Ref. No.		R13, 23, 124	R14	R20	R22	R98	R102	R107	R111	J30	CF1,4	A
DESTINATION												
M	0-02	22	180	NO	NO	33K	10K	22K	10K	YES	L7E-0646-06	NO
E, T	2-73	33	100	YES	YES	12K	3.3K	0.2K	3.3K	NO	L7E-0636-08	YES

(X86-102X-XX)(C/3)

DIST. GEN. CIRCUIT

DISTORTION NARROW

VR3-7 DISTORTION

(X86-102X-XX)(C/3) IC8,9 NJM42000 Q6,7 : 2SK425 (X16, X17)  
IC11~14 : M5218P

(X86-102X-XX)(B/3)

(X86-102X-XX)(B/3)

IC4 :  $\mu$ PC1163HA

IC5 : LA1231NS

IC6 : NJM45600

Q3,4 : 2SK211 (Y,GR)

Q5 : 2SK425 (X16, X17)

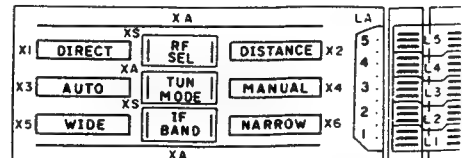
D5,6,12 RLS-73

D7,8 : 1SS226

D9,10 : KVI320-2

D11 : RDS, IM1821

FL1: FIP12AM15S



M5218P

LC7570

$\mu$ PC1163HA

$\mu$ PC78L12J

BA401

CXP5016-216S

2SA733(A)

2SA954

2SA999

2SB764

2SC2003

2SC2320

2SC945(A)

2SD1302

2SD863

MC1495L

2SC2167

2SA933S

2SC1740S

2SK246

2SK163

2SK364

3SK122

G1 G2

2SK161

2SK241

2SK211

2SK302

NJM42000

NJM45600

M5231TL

$\mu$ PD4069UBC

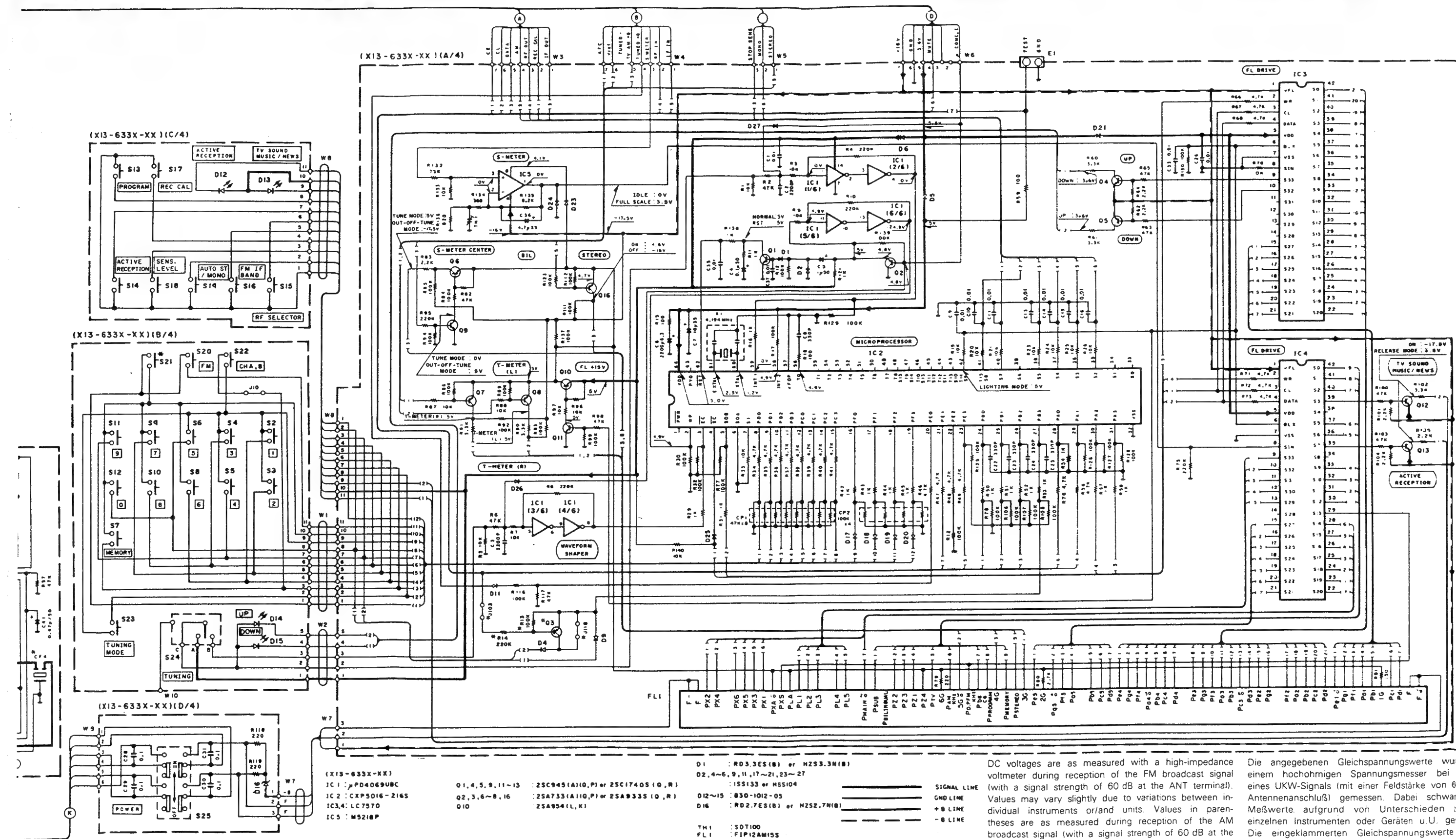
LA1231NS

LA3350S

LM7001

LA1245

$\mu$ PC1163HA



DC voltages are as measured with a high-impedance voltmeter during reception of the FM broadcast signal (with a signal strength of 60 dB at the ANT terminal). Values may vary slightly due to variations between individual instruments or/and units. Values in parentheses are as measured during reception of the AM broadcast signal (with a signal strength of 60 dB at the ANT terminal).

Die angegebenen Gleichspannungswerte wurden mit einem hochohmigen Spannungsmesser bei Empfang eines UKW-Signals (mit einer Feldstärke von 60 dB am Antennenanschluß) gemessen. Dabei schwanken die Meßwerte, aufgrund von Unterschieden zwischen einzelnen Instrumenten oder Geräten u.U. geringfügig. Die eingeklammerten Gleichspannungswerte wurden bei Empfang eines MW-Signals (mit einer Feldstärke von 60 dB am Antennenanschluß) gemessen.

Les tensions c.c. doivent être mesurées avec un voltmètre à haute impédance pendant la réception d'un signal de programme FM (avec une force de signal de 60 dB à la borne ANT). Les valeurs peuvent différer légèrement du fait des variations inhérentes aux appareils et aux instruments de mesure individuels. Les valeurs entre parenthèses doivent être mesurées pendant la réception d'un signal de programme AM avec une force de signal de 60 dB à la borne ANT).

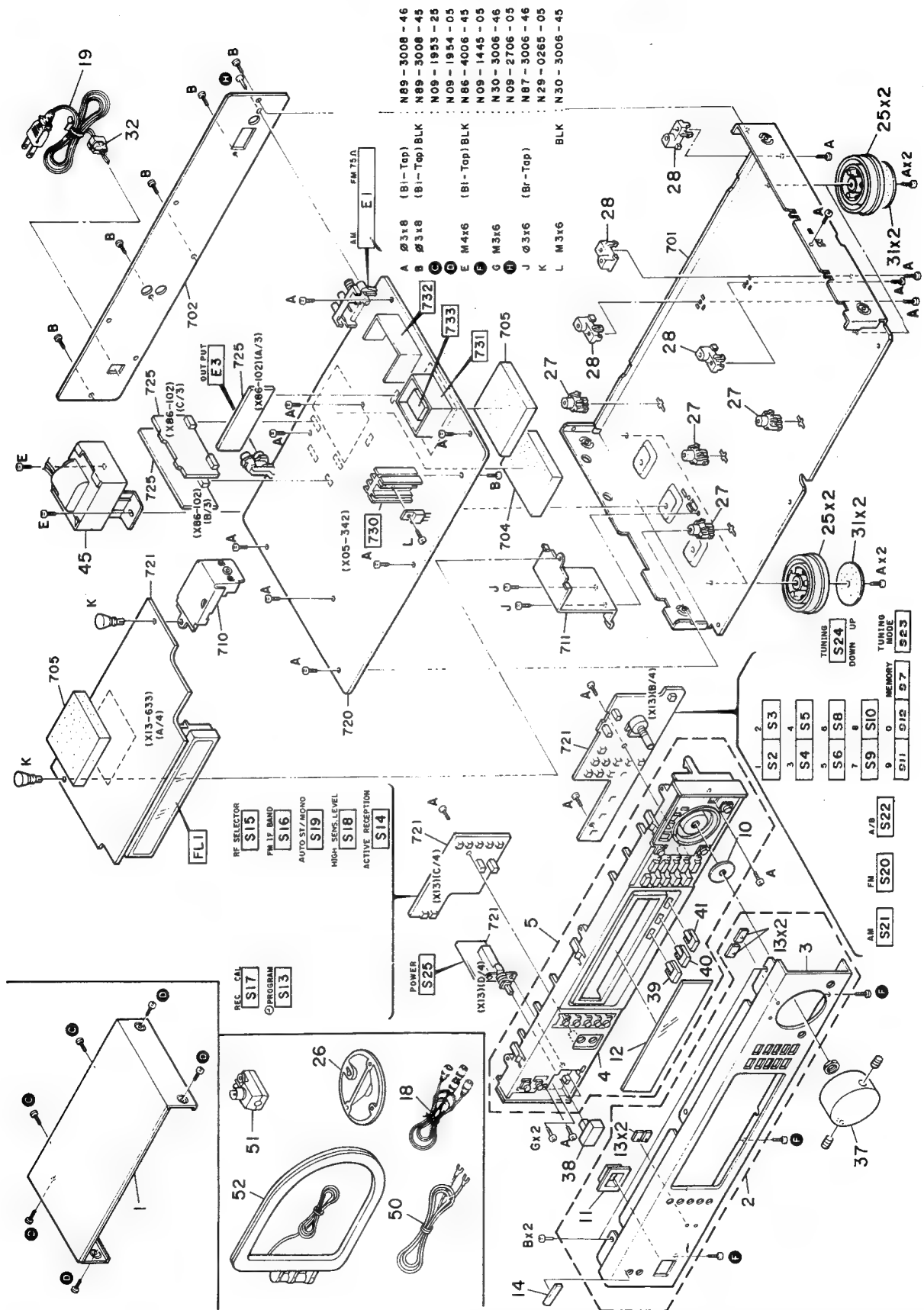
KT-7020 (E112/2)

# KT-7020

## KENWOOD

Y07-3252-71

## EXPLODED VIEW (M type)

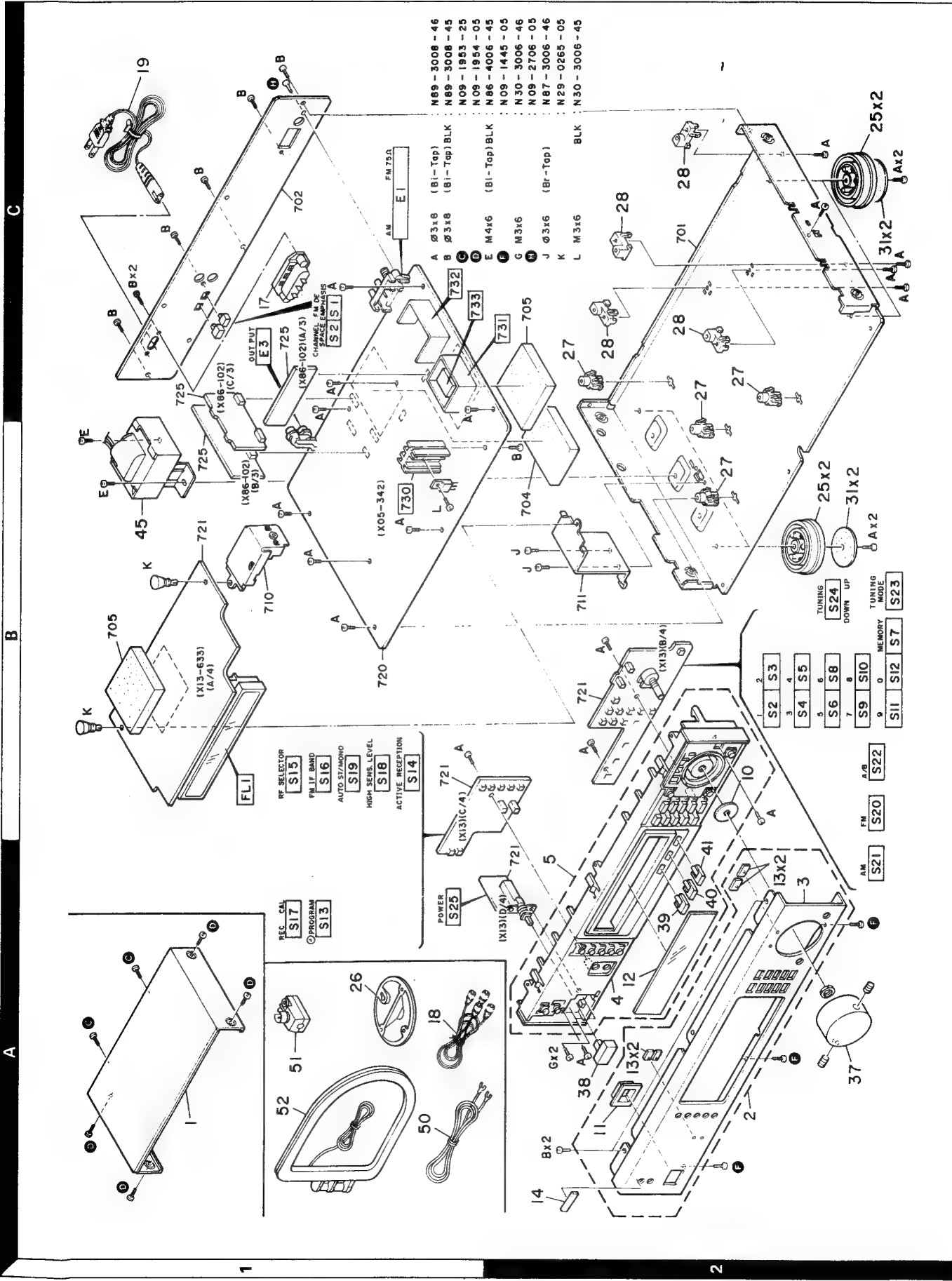


Parts with the exploded numbers larger than 700 are not supplied.



KT-7020

EXPLODED VIEW (E, T type)



Parts with the exploded numbers larger than 700 are not supplied.

# KT-7020

## PARTS LIST

\* New Parts

Parts without Parts No. are not supplied.

Les articles non mentionnés dans le Parts No. ne sont pas fournis.

Teile ohne Parts No. werden nicht geliefert.

Ref. No.	Address	New Parts	Parts No.	Description	Destination	Remarks
参照番号	位置	新	部品番号	部品名 / 規格	仕向	備考
KT-7020						
1	1A	*	A01-1801-01	METALLIC CABINET		
2	2A	*	A20-5889-02	PANEL ASSY		
3	2A	*	A20-5890-02	PANEL		
4	2A	*	A22-1128-01	SUB PANEL		
5	2A	*	A22-1129-02	SUB PANEL ASSY		
10	2B	*	B07-1907-03	ESCUTCHEON		
11	2A	*	B07-1911-04	ESCUTCHEON		
12	2A	*	B10-1043-04	FRONT GLASS		
13	2A	*	B12-0054-04	INDICATOR		
14	2A	*	B43-0287-04	KENWOOD BADGE		
-			B46-0122-13	WARRANTY CARD	E	
-			B46-0143-03	WARRANTY CARD	T	
-		*	B50-9837-00	INSTRUCTION MANUAL(ENGLISH)	E	
-		*	B50-9838-00	INSTRUCTION MANUAL(G/N)	ME	
-		*	B50-9839-00	INSTRUCTION MANUAL(FRENCH)		
-		*	B50-9840-00	INSTRUCTION MANUAL(SPANISH)	M	
-			B58-0803-13	CAUTION CARD	E	
△ 17	1C		E03-0102-25	AC INLET	M	
△ 18	1A		E30-0505-05	AUDIO CORD		
△ 19	1C		E30-0459-05	AC POWER CORD	E	
△ 19	1C		E30-1329-05	AC POWER CORD (INLET)	M	
△ 19	1C		E30-1416-05	AC POWER CORD	T	
-		*	H01-8622-04	ITEM CARTON CASE		
-		*	H10-3886-02	POLYSTYRENE FOAMED FIXTURE(L)		
-		*	H10-3887-02	POLYSTYRENE FOAMED FIXTURE(R)		
-			H25-0181-04	PROTECTION BAG (150X260X0.05)		
-			H25-0224-04	PROTECTION BAG (800X400X0.03)		
-			H25-0232-04	PROTECTION BAG (235X350X0.03)		
25	2B, 2C		J02-1002-05	FOOT		
26	1A		J19-2815-04	ANTENNA HOLDER		
27	2C	*	J19-3179-05	UNIT HOLDER		
28	2C	*	J19-3226-04	HOLDER ASSY		
31	2B, 2C	*	J30-0268-05	SPACER		
△ 32	1C		J42-0083-05	POWER CORD BUSHING	TE	
-			J61-0307-05	WIRE BAND		
37	2A	*	K21-0411-04	KNOB(TUNING)		
38	2A	*	K27-2004-04	KNOB(BUTTON)(POWER)		
39	2A	*	K29-3770-04	KNOB(AM)		
40	2A	*	K29-3774-04	KNOB(FM)		
41	2A	*	K29-3776-04	KNOB(A/B)		
45	1B		L01-4712-05	POWER TRANSFORMER(230V)	TE	
45	1B	*	L01-8894-05	POWER TRANSFORMER(115/230V)	M	
A	2C		N89-3008-46	BINDING HEAD TAPTITE SCREW		
H	1C		N89-3008-45	BINDING HEAD TAPTITE SCREW		
C	1A		N09-1953-25	MACHINE SCREW		
II	1A		N09-1954-05	MACHINE SCREW		
E	1B		N86-4006-45	BINDING HEAD TAPTITE SCREW		
F	2A		N09-1445-05	SET SCREW (M3X8)		
C	2A		N30-3006-46	FAN HEAD MAGNINE SCREW		
H	1C		N09-2706-05	TAPTITE SCREW		
J	2B		N87-3006-46	BRAZIER HEAD TAPTITE SCREW		

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K	1B		N29-0265-05	PUSH RIVET		
50	1A		T90-0132-05	T TYPE ANTENNA		
51	1A		T90-0136-05	ANTENNA ADAPTOR		
52	1A		T90-0173-05	LOOP ANTENNA		
52	1A		T90-0174-05	LOOP ANTENNA		
TUNER UNIT (X05-342X-XX) (0-22: M, 2-71: T, E)						
C2			CC45FSL1H390J	CERAMIC 39PF J		
C4			CC45FTH1H060D	CERAMIC 6.0PF D		
C5			CC45FSL1H010C	CERAMIC 1.0PF C		
C6			CC45FSL1H330J	CERAMIC 33PF J		
C7			CK45FF1H103Z	CERAMIC 0.010UF Z		
C8			CC45FSL1H050C	CERAMIC 5.0PF C		
C9			CC45FSL1H020C	CERAMIC 2.0PF C		
C10			C91-0757-05	CERAMIC 1000PF K		
C11			CK45FF1H103Z	CERAMIC 0.010UF Z		
C12			C91-0757-05	CERAMIC 1000PF K		
C14			CC45FTH1H080D	CERAMIC 8.0PF D		
C15			CC45FSL1H020C	CERAMIC 2.0PF C		
C16			CC45FSL1H010C	CERAMIC 1.0PF C		
C17	18		CC45FSL1H330J	CERAMIC 33PF J		
C19			CC45FTH1H080D	CERAMIC 8.0PF D		
C21			CC45FSL1H070D	CERAMIC 7.0PF D		
C22			C91-0749-05	CERAMIC 220PF K		
C23			CK45FF1H103Z	CERAMIC 0.010UF Z		
C24			CC45FSL1H330J	CERAMIC 33PF J		
C25			CC45FSL1H090D	CERAMIC 9.0PF D		
C26	27		CC45FSL1H050C	CERAMIC 5.0PF C		
C28			C91-0757-05	CERAMIC 1000PF K		
C29			CC45FSL1H010C	CERAMIC 1.0PF C		
C30			C91-0757-05	CERAMIC 1000PF K		
C31			CC45FSL1H330J	CERAMIC 33PF J		
C33			CC45FUJ1H150J	CERAMIC 15PF J		
C34			CE04KW1C220M	ELECTRO 22UF 16WV		
C35			C91-0757-05	CERAMIC 1000PF K		
C36			CC45FUJ1H100D	CERAMIC 10PF D		
C37			CC45FUJ1H070D	CERAMIC 7.0PF D		
C38			CC45FSL1H010C	CERAMIC 1.0PF C		
C39			C91-0737-05	CERAMIC 47PF J		
C40			C91-0757-05	CERAMIC 1000PF K		
C53			CE04KW1H010M	ELECTRO 1.0UF 50WV		
C54			CE04KW1V100M	ELECTRO 10UF 35WV		
C55			C91-0749-05	CERAMIC 220PF K		
C63			C91-0769-05	CERAMIC 0.010UF M		
C64			CC45FCH1H330J	CERAMIC 33PF J		
C65			CC45FCH1H220J	CERAMIC 22PF J		
C66			CE04KW1H010M	ELECTRO 1.0UF 50WV		
C67			C91-0757-05	CERAMIC 1000PF K		
C69			CE04KW1V330M	ELECTRO 33UF 35WV		
C70			CE04KW1V47M	ELECTRO 4.7UF 35WV		
C71			CF92FV1H103J	MF 0.010UF J		
C72			C90-1331-05	NP-ELEC 0.47UF 50WV		
C74			CE04KW1H010M	ELECTRO 1.0UF 50WV		
C75			CK45FF1H223Z	CERAMIC 0.022UF Z		
C76			C91-0769-05	CERAMIC 0.01UF M		

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参照番号	位置	新	部品番号	部品名 / 規格	仕向	備考
C77			C91-0757-05	CERAMIC 1000PF K		
C78			C91-0769-05	CERAMIC 0.01UF M		
C79			CE04KW1V100M	ELECTRO 10UF 35WV		
C80	81		C91-0769-05	CERAMIC 0.01UF M		
C82			C91-0757-05	CERAMIC 1000PF K		
C83			CF92FV1H683J	MF 0.068UF J		
C84			CF92FV1H103J	MF 0.010UF J		
C85			CE04KW1H010M	ELECTRO 1.0UF 50WV		
C86			C91-0769-05	CERAMIC 0.01UF M		
C87			CF92FV1H103J	MF 0.010UF J		
C88			CE04KW1C470M	ELECTRO 47UF 16WV		
C89	90		CE04KW1H3R3M	ELECTRO 3.3UF 50WV		
C91			CC93FCH1H391J	CERAMIC 390PF J		
C92			CK45FF1H223Z	CERAMIC 0.022UF Z		
C93			C91-0769-05	CERAMIC 0.01UF M		
C94			C91-0737-05	CERAMIC 47PF J		
C95	97		CF92FV1H123J	MF 0.012UF J		
C99	100		CE04KW0J221M	ELECTRO 220UF 6.3WV		
C101			CE04KW1H2R2M	ELECTRO 2.2UF 50WV		
C102			CC45FSL1H101J	CERAMIC 100PF J		
C103			CE04KW1H010M	ELECTRO 1.0UF 50WV		
C104			CE04KW1V100M	ELECTRO 10UF 35WV		
C105			CF92FV1H103J	MF 0.010UF J		
C106			CE04KW1HR47M	ELECTRO 0.47UF 50WV		
C128			C90-1334-05	NP-ELEC 47UF 10WV		
C129	130		CQ09FS1H511J	POLYSTY 510PF J		
C131			CQ09FS1H102J	POLYSTY 1000PF J		
C132			CQ93HP2A102J	MYLAR 1000PF J		
C133			CE04KW1C101M	ELECTRO 100UF 16WV		
C134			CQ93HP2A183J	MYLAR 0.018UF J		
C135			CF92FV1H103J	MF 0.010UF J		
C136			CE04KW1H010M	ELECTRO 1.0UF 50WV		
C137			CE04KW1H3R3M	ELECTRO 3.3UF 50WV		
C138			CE04GW1H010M	LL-ELEC 1.0UF 50WV		
C139			CF92FV1H103J	MF 0.010UF J		
C140			CE04GW1HR47M	LL-ELEC 0.47UF 50WV		
C141			CE04GW1H010M	LL-ELEC 1.0UF 50WV		
C142	143		CE04KW1A101M	ELECTRO 100UF 10WV		
C144			CC45FSL1H100D	CERAMIC 10PF D		
C145	146		CF92FV1H472J	MF 4700PF J		
C147	148		CF92FV1H242J	MF 2400PF J		
C149			CQ09FS1H122J	POLYSTY 1200PF J		
C149			CQ09FS1H202J	POLYSTY 2000PF J		
C150			CK45FF1H103Z	CERAMIC 0.010UF Z		
C153	154		CF92FV1H392J	MF 3900PF J		
C155	158		CE04KW1V100M	ELECTRO 10UF 35WV		
C159			CE04KW1A101M	ELECTRO 100UF 10WV		
C160	163		CK45FF1H103Z	CERAMIC 0.010UF Z		
C164			CE04KW1E332M	ELECTRO 3300UF 25WV		
C165			CE04KW1V471M	ELECTRO 470UF 35WV		
C166	167		CK45FF1H103Z	CERAMIC 0.010UF Z		
C168			CE04KW1V331M	ELECTRO 330UF 35WV		
C169			CE04KW1H331M	ELECTRO 330UF 50WV		
C170			CE04KW1V330M	ELECTRO 33UF 35WV		
C171			C91-0757-05	CERAMIC 1000PF K		

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C172			CE04KW1H010M	ELECTR 1.0UF 50WV		
C173			CE04KW1V100M	ELECTR 10UF 35WV		
C174			CE04KW1V101M	ELECTR 100UF 35WV		
C175			CK45FB1H102K	CERAMIC 1000PF K		
C176			CE04KW1H010M	ELECTR 1.0UF 50WV		
C177			CE04KW1V100M	ELECTR 10UF 35WV		
C178			CE04KW1H101M	ELECTR 100UF 50WV		
C179			CK45FB1H102K	CERAMIC 1000PF K		
C180			CE04KW1A101M	ELECTR 100UF 10WV		
C181			CE04KW1H010M	ELECTR 1.0UF 50WV		
C182, 183			CE04KW1V100M	ELECTR 10UF 35WV		
C184			CE04KW1E101M	ELECTR 100UF 25WV		
C185, 186			CE04KW1V100M	ELECTR 10UF 35WV		
C187, 188			CK45FF1H103Z	CERAMIC 0.010UF Z		
C189			CE04KW1H2R2M	ELECTR 2.2UF 50WV		
C190			CK45FF1H103Z	CERAMIC 0.010UF Z		
C191			CE04KW1E470M	ELECTR 47UF 25WV		
C192, 193			CE04KW1V100M	ELECTR 10UF 35WV		
C200			CE04KW1V100M	ELECTR 10UF 35WV		
C203			C91-0749-05	CERAMIC 220PF K		
C204, 205			CK45FF1H103Z	CERAMIC 0.010UF Z	TE	
C206, 207			CK45B1H331K	CERAMIC 330PF K	TE	
C208			C91-0749-05	CERAMIC 220PF K		
C209			CE04KW1H2R2M	ELECTR 2.2UF 50WV		
TC1			C05-0301-05	CERAMIC TRIMMER CAPACITOR(7PF)		
TC2 ,3			C05-0303-05	CERAMIC TRIMMER CAPACITOR(20PF)		
E1 ,2	1C		E20-0318-05	SCREW TERMINAL BOARD(2P)(ANT.)		
E3	1C		E13-0235-05	PHONE JACK(2P)(OUTPUT)		
CF1			L72-0096-05	CERAMIC FILTER		
L1			L31-0545-05	FM-RF COIL		
L2			L40-1092-14	SMALL FIXED INDUCTOR(1.0UH,M)		
L3			L92-0017-05	FERRITE CORE	M	
L4			L31-0546-05	FM-RF COIL		
L5 ,6			L40-1092-14	SMALL FIXED INDUCTOR(1.0UH,M)		
L7			L31-0545-05	FM-RF COIL		
L8			L40-1092-14	SMALL FIXED INDUCTOR(1.0UH,M)		
L9			L92-0017-05	FERRITE CORE		
L10			L32-0270-05	FM OSCILLATING COIL		
L11			L92-0017-05	FERRITE CORE		
L12 ,13			L40-1001-17	SMALL FIXED INDUCTOR(10UH,K)		
L14			L32-0270-05	FM OSCILLATING COIL		
L15 ,16			L92-0017-05	FERRITE CORE	M	
L16			L92-0017-05	FERRITE CORE	TE	
L17			L30-0434-05	FM IFT		
L25			L40-1001-17	SMALL FIXED INDUCTOR(10UH,K)		
L26			L31-0509-05	MW-RF COIL		
L27			L32-0277-15	MW OSCILLATING COIL		
L28			L30-0467-05	AM IFT		
L29			L39-0128-05	PEAKING COIL		
L30 ,31			L92-0017-05	FERRITE CORE		
L32			L39-0143-05	PEAKING COIL		
L33			L35-0064-05	MPX COIL		
L34			L79-0729-05	LC FILTER		

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L35 ,36			L40-1092-14	SMALL FIXED INDUCTOR(1.0UH,M)	TE	
L36			L40-1092-14	SMALL FIXED INDUCTOR(1.0UH,M)	M	
L37 -39			L92-0017-05	FERRITE CORE		
X1			L77-1122-05	CRYSTAL RESONATOR(7.2MHz)		
B	2B		N89-3008-45	BINDING HEAD TAPTITE SCREW		
L	1B	*	N30-3006-45	PAN HEAD MACHINE SCREW		
R43			RS14KB3A681J	FL-PROOF RS 680 J 1W	TE	
R59			RD14GB2E330J	FL-PROOF RD 33 J 1/4W	TE	
R92			RD14GB2E101J	FL-PROOF RD 100 J 1/4W	TE	
R119			RD14GB2E101J	FL-PROOF RD 100 J 1/4W		
R227		*	RN14BK2C7501F	RN 7.50K F 1/6W		
R236			RN14BK2C1782F	RN 17.8K F 1/6W		
R240			RN14BK2C6811F	RN 6.81K F 1/6W		
R242		*	RN14BK2C2871F	RN 2.87K F 1/6W	TE	
R252			RN14BK2C3831F	RN 3.83K F 1/6W		
R252			RN14BK2C4641F	RN 4.64K F 1/6W	M	
R254			RN14BK2C3161F	RN 3.16K F 1/6W		
R256			RN14BK2C3161F	RN 3.16K F 1/6W		
R299			RD14GB2E101J	FL-PROOF RD 100 J 1/4W	TE	
R303			RD14GB2E330J	FL-PROOF RD 33 J 1/4W	TE	
R312			RS14KB3A331J	FL-PROOF RS 330 J 1W		
R313			RD14GB2E330J	FL-PROOF RD 33 J 1/4W	TE	
R315			RS14KB3A121J	FL-PROOF RS 120 J 1W		
R318			RD14GB2E331J	FL-PROOF RD 330 J 1/4W	TE	
R319			RS14KB3A561J	FL-PROOF RS 560 J 1W		
R320			RD14GB2E100J	FL-PROOF RD 10 J 1/4W	TE	
R325, 326			RD14GB2E101J	FL-PROOF RD 100 J 1/4W	TE	
R327			RD14GB2E470J	FL-PROOF RD 47 J 1/4W	TE	
VR3			R12-1085-05	TRIMMING POT.(2.2K)		
VR4 ,5			R12-1087-05	TRIMMING POT.(3.3K)		
S1 ,2	1C		S31-2094-05	SLIDE SWITCH (CH SPACE,)	M	
D1			1SS85	DIODE		
D2			KV1320-5	VARIABLE CAPACITANCE DIODE		
D3			1SV80	DIODE		
D4			1SS85	DIODE		
D5 -8			KV1320-5	VARIABLE CAPACITANCE DIODE		
D19 ,20			HSS104	DIODE		
D19 ,20			1SS133	DIODE		
D21			HZS5.1N(B2)	ZENER DIODE		
D21			RD5.1ES(B2)	ZENER DIODE		
D27 -32			HSS104	DIODE		
D27 -32			1SS133	DIODE		
D35			HSS104	DIODE		
D35			1SS133	DIODE		
D36			KV1236(Z2)	VARIABLE CAPACITANCE DIODE		
D38 -45			HSS104	DIODE		
D38 -45			1SS133	DIODE		
D48 -52			HSS104	DIODE		
D48 -52			1SS133	DIODE		
D59 -62			HSS104	DIODE		
D59 -62			1SS133	DIODE		
D64			HSS104	DIODE		
D64			1SS133	DIODE		

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D65		HZS5.1N(B2)	ZENER DIODE		
D65		RD5.1ES(B2)	ZENER DIODE		
D66		HZS11N(B2)	ZENER DIODE		
D66		RD11ES(B2)	ZENER DIODE		
D73		HSS104	DIODE		
D73		1SS133	DIODE		
D74 -79		S5566B	DIODE		
D80		HZS5.6N(B2)	ZENER DIODE		
D80		RD5.6ES(B2)	ZENER DIODE		
D81		HZS5.1N(B2)	ZENER DIODE		
D81		RD5.1ES(B2)	ZENER DIODE		
D82		HZS18N(B)	ZENER DIODE		
D82		RD18ES(B)	ZENER DIODE		
D83 ,84		S5566B	DIODE		
D85		HSS104	DIODE		
D85		1SS133	DIODE		
D86 ,87		S5566B	DIODE		
D88 ,89		HSS104	DIODE		
D88 ,89		1SS133	DIODE		
IC1		LM7001	IC(PLL FREQUENCY SYNTHESIZER)		
IC4		LA1245	IC(AM)		
IC5		M5218P	IC(OP AMP X2)		
IC6		BA401	IC(FM IF)		
IC7 -9		M5218P	IC(OP AMP X2)		
IC14		NJM4560D	IC(OP AMP X2)		
IC15		LA3361	IC(FM MPX PLL)		
IC16		UPC78L12J	IC(VOLTAGE REGULATOR/ +12V)		
IC17		NJM4560D	IC(OP AMP X2)		
IC18		MC1495L	IC(MULTIPLIER)		
IC19		M5218P	IC(OP AMP X2)		
IC20,21		NJM4560D	IC(OP AMP X2)		
IC22		M5231TL	IC(VOLTAGE REGULATOR)		
IC23		UPC7805HF	IC(VOLTAGE REGULATOR/ +5V)		
Q1 ,2		3SK122(L)	FET		
Q3		2SK241(Y,GR)	FET		
Q4 ,5		2SK161(GR)	FET		
Q6		2SK241(Y,GR)	FET		
Q8		2SC2003(L,K)	TRANSISTOR		
Q9		2SC2320(E,F)	TRANSISTOR		
Q9		2SC945(A)(Q,P)	TRANSISTOR		
Q10		2SA733(A)(Q,P)	TRANSISTOR		
Q10		2SA999(E,F)	TRANSISTOR		
Q11		2SC2320(E,F)	TRANSISTOR		
Q11		2SC945(A)(Q,P)	TRANSISTOR		
Q12 ,13		2SK364(GR,BL)	FET		
Q14 ,15		2SA733(A)(Q,P)	TRANSISTOR		
Q14 ,15		2SA999(E,F)	TRANSISTOR		
Q16		2SC2320(E,F)	TRANSISTOR		
Q16		2SC945(A)(Q,P)	TRANSISTOR		
Q17		2SA733(A)(Q,P)	TRANSISTOR		
Q17		2SA999(E,F)	TRANSISTOR		
Q18 ,19		2SC2320(E,F)	TRANSISTOR		
Q18 ,19		2SC945(A)(Q,P)	TRANSISTOR		
Q20		2SA733(A)(Q,P)	TRANSISTOR		
Q20		2SA999(E,F)	TRANSISTOR		

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Q21		2SC2320(E,F)	TRANSISTOR		
Q21		2SC945(A)(Q,P)	TRANSISTOR		
Q22		2SA733(A)(Q,P)	TRANSISTOR		
Q22		2SA999(E,F)	TRANSISTOR		
Q23 -25		2SC2320(E,F)	TRANSISTOR		
Q23 -25		2SC945(A)(Q,P)	TRANSISTOR		
Q26 ,27		2SK246(Y,GR)	FET		
Q28		2SC2320(E,F)	TRANSISTOR		
Q28		2SC945(A)(Q,P)	TRANSISTOR		
Q34		2SC2320(E,F)	TRANSISTOR		
Q34		2SC945(A)(Q,P)	TRANSISTOR		
Q35		2SK163(L,M)	FET		
Q36		2SK364(GR,BL)	FET		
Q37 -40		2SA733(A)(Q,P)	TRANSISTOR		
Q37 -40		2SA999(E,F)	TRANSISTOR		
Q41 ,42		2SC2320(E,F)	TRANSISTOR		
Q41 ,42		2SC945(A)(Q,P)	TRANSISTOR		
Q43		2SK246(Y,GR)	FET		
Q44		2SK364(GR,BL)	FET		
Q51 ,52		2SD1302(S,T)	TRANSISTOR		
Q53 ,54		2SA733(A)(Q,P)	TRANSISTOR		
Q53 ,54		2SA999(E,F)	TRANSISTOR		
Q55		2SC2167(O,Y)	TRANSISTOR		
Q56		2SB764(E,F)	TRANSISTOR		
Q57		2SA733(A)(Q,P)	TRANSISTOR		
Q57		2SA999(E,F)	TRANSISTOR		
Q58		2SD863(E,F)	TRANSISTOR		
Q59		2SC2320(E,F)	TRANSISTOR		
Q59		2SC945(A)(Q,P)	TRANSISTOR		
Q60		2SD863(E,F)	TRANSISTOR		
Q61		2SB764(E,F)	TRANSISTOR		
Q62		DTC124ES	DIGITAL TRANSISTOR		
SUB-CIRCUIT UNIT (X13-633X-XX) (0-21: M, 2-71: T, E)					
D12 -15		B30-1012-05	LED(SLP-981C-50)		
C1		CK45FF1H103Z	CERAMIC 0.010UF Z		
C2 ,3		CK45FB1H222K	CERAMIC 2200PF K		
C4		CE04KW1H0R1M	ELECTRO 0.1UF 50WV		
C5		CE04KW1H010M	ELECTRO 1.0UF 50WV		
C6		CE04KW0J222M	ELECTRO 2200UF 6.3WV		
C7		CE04KW1V100M	ELECTRO 10UF 35WV		
C8		CC45FSL1H331J	CERAMIC 330PF J		
C9 -11		C91-0769-05	CERAMIC 0.01UF M		
C13 -16		C91-0769-05	CERAMIC 0.01UF M		
C22 -25		CC45FSL1H331J	CERAMIC 330PF J		
C26		C91-0769-05	CERAMIC 0.01UF M		
C28 -31		CF92FV1H104J	MF 0.10UF J		
C33		C91-0769-05	CERAMIC 0.01UF M		
C35		CK45FF1H103Z	CERAMIC 0.010UF Z		
C36		CE04KW1V4R7M	ELECTRO 4.7UF 35WV		
C37		C91-0769-05	CERAMIC 0.01UF M		
X1		L78-0209-05	RESONATOR (4.194MHZ)		
CP1		R90-0462-05	MULTI-COMP 47KX8 J 1/4W		

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CP2			R90-0291-05	MULTI-COMP 100KX4 J 1/6W		
S2 -23	1B, 2B		S40-1064-05	PUSH SWITCH(1-0, MEMORY)		
S25	1A		S40-4061-05	PUSH SWITCH(POWER)		
S24	2B	*	T99-0243-05	SPEED DETECTOR(TUNING)		
D1			HZS3.3N(B)	ZENER DIODE		
D1			RD3.3ES(B)	ZENER DIODE		
D2			HSS104	DIODE		
D2			1SS133	DIODE		
D4 -6			HSS104	DIODE		
D4 -6			1SS133	DIODE		
D9			HSS104	DIODE		
D9			1SS133	DIODE		
D11			HSS104	DIODE		
D11			1SS133	DIODE		
D16			HZS2.7N(B)	ZENER DIODE		
D16			RD2.7ES(B)	ZENER DIODE		
D17 -21			HSS104	DIODE		
D17 -21			1SS133	DIODE		
D23 -27			HSS104	DIODE		
D23 -27			1SS133	DIODE		
FL1	1B		FIP12AM15S	FLUORESCENT INDICATOR TUBE		
IC1			UPD4069UBC	IC(INVERTER X6)		
IC2			CXP5016-216S	IC(MICRO PROCESSOR)		
IC3 ,4			LC7570	IC(FIP STATIC DRIVER)		
IC5			M5218P	IC(OP AMP X2)		
Q1			2SC1740S(Q,R)	TRANSISTOR	TE	
Q1			2SC945(A)(Q,P)	TRANSISTOR	TE	
Q2			2SA733(A)(Q,P)	TRANSISTOR	M	
Q2			2SA933S(Q,R)	TRANSISTOR	M	
Q2 ,3			2SA733(A)(Q,P)	TRANSISTOR	M	
Q2 ,3			2SA933S(Q,R)	TRANSISTOR	M	
Q4 ,5			2SC1740S(Q,R)	TRANSISTOR		
Q4 ,5			2SC945(A)(Q,P)	TRANSISTOR		
Q6 -8			2SA733(A)(Q,P)	TRANSISTOR		
Q6 -8			2SA933S(Q,R)	TRANSISTOR		
Q9			2SC1740S(Q,R)	TRANSISTOR		
Q9			2SC945(A)(Q,P)	TRANSISTOR		
Q10			2SA954(L,K)	TRANSISTOR		
Q11 -13			2SC1740S(Q,R)	TRANSISTOR		
Q11 -13			2SC945(A)(Q,P)	TRANSISTOR		
Q16			2SA733(A)(Q,P)	TRANSISTOR		
Q16			2SA933S(Q,R)	TRANSISTOR		
TH1			SDT100	THERMISTOR		
IF-DET UNIT (X86-102X-XX) (0-02: M, 2-73: T, E)						
C1 ,2			C93-0012-05	CYLND CHIP C 0.01UF M		
C6			C93-0012-05	CYLND CHIP C 0.01UF M		
C9 -12			C93-0012-05	CYLND CHIP C 0.01UF M		
C13			CK41FSL1H221K	CYLND CHIP C 220PF K		
C14 -18			C93-0012-05	CYLND CHIP C 0.01UF M		
C19			CE04KWQJ471M	ELECTRO 470UF 6.3WV		
C20 ,21			CC41FSL1H330J	CYLND CHIP C 33PF J		
C22 ,23			CK73EB1E473K	CHIP C 0.047UF K		
C24			CC41FUJ1H130J	CYLND CHIP C 13PF J		

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C25 ,26			C93-0012-05	CYLND CHIP C 0.01UF M		
C27			CQ09FS1H271J	POLYSTY 270PF J		
C28			CC41FSL1H220J	CYLND CHIP C 22PF J		
C29 -33			C93-0012-05	CYLND CHIP C 0.01UF M		
C34			C93-0013-05	CERAMIC 22000PF 25WV		
C35			CE04KW1H010M	ELECTRO 1.0UF 50WV		
C36 -40			C93-0012-05	CYLND CHIP C 0.01UF M		
C41			CE04KW1HR47M	ELECTRO 0.47UF 50WV		
C42			C90-1334-05	NP-ELEC 47UF 10WV		
C43			CC41FSL1H020C	CYLND CHIP C 2.0PF C		
C44			C90-1334-05	NP-ELEC 47UF 10WV		
C45 ,46			CF92FV1H102J	MF 1000PF J		
C48 -51			CF92FV1H102J	MF 1000PF J		
C54 ,55			CE04KW1A470M	ELECTRO 47UF 10WV		
C56			C93-0012-05	CYLND CHIP C 0.01UF M		
C57			C93-0013-05	CERAMIC 22000PF 25WV		
C58			CK41FA1H101K	CYLND CHIP C 100PF K		
C59			CK41FY1E102M	CYLND CHIP C 1000PF M		
C61 ,62			C93-0012-05	CYLND CHIP C 0.01UF M		
C63			CK41FA1H101K	CYLND CHIP C 100PF K		
C64			CE04KW1V4R7M	ELECTRO 4.7UF 35WV		
CF1			L72-0536-05	CERAMIC FILTER	TE	
CF1			L72-0546-05	CERAMIC FILTER	M	
CF3			L72-0541-05	CERAMIC FILTER	TE	
CF4			L72-0536-05	CERAMIC FILTER	M	
CF4			L72-0546-05	CERAMIC FILTER		
L1			L92-0018-05	FERRITE CORE		
L4			L92-0018-05	FERRITE CORE		
L5			L40-1092-16	SMALL FIXED INDUCTOR(1UH,M)		
L6 ,7			L92-0018-05	FERRITE CORE		
L8			L39-0128-05	PEAKING COIL		
L9			L30-0435-05	FM IFT		
L10			L92-0018-05	FERRITE CORE		
L11			L30-0434-05	FM IFT		
L12			L32-0294-05	FM OSCILLATING COIL		
L13			L92-0018-05	FERRITE CORE		
L15			L92-0018-05	FERRITE CORE		
R1			R92-0338-05	CYLND CHIP R 0 OHM		
R1			R92-0350-05	JUMPER WIRE (RESISTOR TYPE)		
R4			RD41FB2B391J	CYLND CHIP R 390 J 1/8W		
R7			RD41FB2B102J	CYLND CHIP R 1.0K J 1/8W		
R7			RD41FB2B132J	CYLND CHIP R 1.3K J 1/8W		
R11			RD41FB2B102J	CYLND CHIP R 1.0K J 1/8W		
R12			RD41FB2B21J	CYLND CHIP R 820 J 1/8W		
R13			RD41FB2B220J	CYLND CHIP R 22 J 1/8W	M	
R13			RD41FB2B330J	CYLND CHIP R 33 J 1/8W	TE	
R14			RD41FB2B101J	CYLND CHIP R 100 J 1/8W	TE	
R14			RD41FB2B151J	CYLND CHIP R 150 J 1/8W		
R15			RD41FB2B102J	CYLND CHIP R 1.0K J 1/8W	M	
R16 ,17			RD41FB2B132J	CYLND CHIP R 1.3K J 1/8W		
R18 ,19			RD41FB2B102J	CYLND CHIP R 1.0K J 1/8W		
R20			RD41FB2B221J	CYLND CHIP R 220 J 1/8W	TE	
R21			RD41FB2B561J	CYLND CHIP R 560 J 1/8W		

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R22			RD41FB2B362J	CYLND CHIP R 3.6K J 1/8W	TE	
R23			RD41FB2B220J	CYLND CHIP R 22 J 1/8W	M	
R23			RD41FB2B330J	CYLND CHIP R 33 J 1/8W	TE	
R24			RD41FB2B331J	CYLND CHIP R 330 J 1/8W		
R26			RD41FB2B561J	CYLND CHIP R 560 J 1/8W		
R27			RD41FB2B221J	CYLND CHIP R 220 J 1/8W		
R28			RD41FB2B104J	CYLND CHIP R 100K J 1/8W		
R29			RD41FB2B471J	CYLND CHIP R 470 J 1/8W		
R30			RD41FB2B104J	CYLND CHIP R 100K J 1/8W		
R31 ,32			RD41FB2B105J	CYLND CHIP R 1.0M J 1/8W		
R33			RD41FB2B101J	CYLND CHIP R 100 J 1/8W		
R34			RD41FB2B102J	CYLND CHIP R 1.0K J 1/8W		
R35			RD41FB2B472J	CYLND CHIP R 4.7K J 1/8W		
R36 -41			RD41FB2B102J	CYLND CHIP R 1.0K J 1/8W		
R42			RD41FB2B224J	CYLND CHIP R 220K J 1/8W		
R43			RD41FB2B102J	CYLND CHIP R 1.0K J 1/8W		
R44			RD41FB2B221J	CYLND CHIP R 220 J 1/8W		
R45			RD41FB2B123J	CYLND CHIP R 12K J 1/8W		
R46			RD41FB2B203J	CYLND CHIP R 20K J 1/8W		
R47			RD41FB2B392J	CYLND CHIP R 3.9K J 1/8W		
R48			RD41FB2B105J	CYLND CHIP R 1.0M J 1/8W		
R49			RD41FB2B223J	CYLND CHIP R 22K J 1/8W		
R50			RD41FB2B561J	CYLND CHIP R 560 J 1/8W		
R51			RD41FB2B512J	CYLND CHIP R 5.1K J 1/8W		
R52			RD41FB2B223J	CYLND CHIP R 22K J 1/8W		
R53			RD41FB2B101J	CYLND CHIP R 100 J 1/8W		
R54			RD41FB2B221J	CYLND CHIP R 220 J 1/8W		
R55			RD41FB2B331J	CYLND CHIP R 330 J 1/8W		
R56			RD41FB2B223J	CYLND CHIP R 22K J 1/8W		
R57			RD41FB2B473J	CYLND CHIP R 47K J 1/8W		
R58			RD41FB2B223J	CYLND CHIP R 22K J 1/8W		
R59 ,60			RD41FB2B513J	CYLND CHIP R 51K J 1/8W		
R61			RD41FB2B223J	CYLND CHIP R 22K J 1/8W		
R62 ,63			RD41FB2B513J	CYLND CHIP R 51K J 1/8W		
R64			RD41FB2B113J	CYLND CHIP R 11K J 1/8W		
R65			RD41FB2B223J	CYLND CHIP R 22K J 1/8W		
R66 ,67			RD41FB2B513J	CYLND CHIP R 51K J 1/8W		
R68 ,69			RD41FB2B223J	CYLND CHIP R 22K J 1/8W		
R70 ,71			RD41FB2B513J	CYLND CHIP R 51K J 1/8W		
R80			RD41FB2B273J	CYLND CHIP R 27K J 1/8W		
R81			RD41FB2B223J	CYLND CHIP R 22K J 1/8W	TE	
R82			RD41FB2B822J	CYLND CHIP R 8.2K J 1/8W		
R83			RD41FB2B123J	CYLND CHIP R 12K J 1/8W		
R84			RD41FB2B223J	CYLND CHIP R 22K J 1/8W	TE	
R85			RD41FB2B105J	CYLND CHIP R 1.0M J 1/8W		
R86			RD41FB2B223J	CYLND CHIP R 22K J 1/8W		
R87			RD41FB2B393J	CYLND CHIP R 39K J 1/8W		
R88			RD41FB2B102J	CYLND CHIP R 1.0K J 1/8W		
R90 -93			RD41FB2B103J	CYLND CHIP R 10K J 1/8W		
R94			RD41FB2B222J	CYLND CHIP R 2.2K J 1/8W		
R95			RD41FB2B103J	CYLND CHIP R 10K J 1/8W		
R96			RD41FB2B222J	CYLND CHIP R 2.2K J 1/8W		
R97			RD41FB2B103J	CYLND CHIP R 10K J 1/8W		
R98			RD41FB2B123J	CYLND CHIP R 12K J 1/8W	TE	
R98			RD41FB2B333J	CYLND CHIP R 33K J 1/8W	M	

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R99			RD41FB2B102J	CYLND CHIP R 1.0K J 1/8W		
R100			RD41FB2B222J	CYLND CHIP R 2.2K J 1/8W		
R101			RD41FB2B103J	CYLND CHIP R 10K J 1/8W	TE	
R101,102			RD41FB2B103J	CYLND CHIP R 10K J 1/8W	M	
R102			RD41FB2B332J	CYLND CHIP R 3.3K J 1/8W	TE	
R103			RD41FB2B102J	CYLND CHIP R 1.0K J 1/8W		
R104			RD41FB2B222J	CYLND CHIP R 2.2K J 1/8W		
R105			RD41FB2B103J	CYLND CHIP R 10K J 1/8W		
R106			RD41FB2B561J	CYLND CHIP R 560 J 1/8W		
R107			RD41FB2B223J	CYLND CHIP R 22K J 1/8W	M	
R107			RD41FB2B822J	CYLND CHIP R 8.2K J 1/8W	TE	
R108			RD41FB2B222J	CYLND CHIP R 2.2K J 1/8W		
R109			RD41FB2B103J	CYLND CHIP R 10K J 1/8W		
R110			RD41FB2B222J	CYLND CHIP R 2.2K J 1/8W		
R111			RD41FB2B332J	CYLND CHIP R 3.3K J 1/8W	TE	
R111,112			RD41FB2B103J	CYLND CHIP R 10K J 1/8W	M	
R112			RD41FB2B103J	CYLND CHIP R 10K J 1/8W	TE	
R113			RD41FB2B561J	CYLND CHIP R 560 J 1/8W		
R124			RD41FB2B220J	CYLND CHIP R 22 J 1/8W	M	
R124			RD41FB2B330J	CYLND CHIP R 33 J 1/8W	TE	
R125,126			RD41FB2B472J	CYLND CHIP R 4.7K J 1/8W		
R127			RD41FB2B101J	CYLND CHIP R 100 J 1/8W		
R128			RD41FB2B154J	CYLND CHIP R 150K J 1/8W		
R129			RD41FB2B105J	CYLND CHIP R 1.0M J 1/8W		
R132-135			RD41FB2B104J	CYLND CHIP R 100K J 1/8W		
R136,137			RD41FB2B105J	CYLND CHIP R 1.0M J 1/8W	TE	
R137			RD41FB2B105J	CYLND CHIP R 1.0M J 1/8W	M	
VR1			R12-1070-05	TRIMMING POT.(1K)		
VR2			R12-5048-05	TRIMMING POT.(100K)	TE	
VR3			R12-3100-05	TRIMMING POT.(10K)		
VR4 ,5			R12-3101-05	TRIMMING POT.(22K)		
VR6			R12-1070-05	TRIMMING POT.(1K)		
VR7			R12-3101-05	TRIMMING POT.(22K)		
D2			1SS184	DIODE		
D5 ,6			RLS-73	DIODE		
D7 ,8			1SS226	DIODE		
D9 ,10			KV1320-2	VARIABLE CAPACITANCE DIODE		
D11			RD5.1M(B2)	ZENER DIODE		
D12			RLS-73	DIODE		
IC2 ,3			BA401	IC(FM IF)		
IC4			UPC1163HA	IC(IF AMP)		
IC5			LA1231NS	IC(FM IF/DETECTION)		
IC6			NJM45600	IC(OP AMP X2)		
IC8 ,9			NJM4200D	IC(OP AMP X2)		
IC11-14			MS218P	IC(OP AMP X2)		
Q1			2SK302(Y,GR)	FET		
Q3 ,4			2SK211(Y,GR)	FET		
Q5			2SK425(X16,X17)	FET	M	
Q5 -7			2SK425(X16,X17)	FET	TE	
Q7			2SK425(X16,X17)	FET	M	

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# KT-7020

## SPECIFICATIONS

### For other Countries

#### FM tuner Section

Tuning frequency range ..... 87.5 MHz - 108 MHz  
Usable sensitivity (MONO) ..... 0.95  $\mu$ V/10.8 dBf

#### 50 dB quieting sensitivity

MONO ..... 1.8  $\mu$ V/16.2 dBf  
STEREO ..... 24  $\mu$ V/38.8 dBf

#### Total harmonic distortion (at 1 kHz)

MONO ..... 0.007% (WIDE)  
STEREO ..... 0.009% (WIDE)

#### Signal to noise ratio (at 1 kHz, 85 dBf input)

MONO ..... 92 dB  
STEREO ..... 86 dB

#### Stereo separation

1 kHz ..... 65 dB (WIDE)  
Capture ratio ..... 1.0 dB (WIDE), 2.5 dB (NARROW)

#### Alternate channel selectivity

( $\pm$  400 kHz) ..... 60 dB (WIDE)

#### Image rejection ratio (at 98 MHz)

..... 82 dB

#### IF rejection ratio (at 98 MHz)

..... 110 dB

#### Spurious rejection ratio (at 98 MHz)

..... 105 dB

#### AM suppression ratio

..... 76 dB

#### Frequency response

(20 Hz - 15 kHz) ..... +0.5 dB, -0.5 dB

#### Output level/Impedance

(at 1 kHz, 100% dev.) ..... 0.6V/3.3k $\Omega$

#### AM Tuner Section

##### Tuning frequency range

531 kHz - 1,602 kHz ..... 9 kHz step

530 kHz - 1,610 kHz ..... 10 kHz step

##### Usable sensitivity

..... 10  $\mu$ V (350  $\mu$ V/m)

##### Signal to noise ratio

(at 30% mod. 1mV input) ..... 55 dB

##### Total harmonic distortion

..... 0.25%

##### Image rejection ratio (Loop)

..... 40 dB

##### Selectivity

..... 30 dB

##### Output level/Impedance

(at 30% mod.) ..... 0.18 V/3.3 k $\Omega$

#### General

Power consumption ..... 20 W

Dimension ..... W: 440 mm

H: 98 mm

D: 318 mm

Weight ..... 4.3 kg

KENWOOD follows a policy of continuous advancements in development. For this reason specifications may be changed without notice.

KENWOOD poursuit une politique de progrès constants en ce qui concerne le développement. Pour cette raison, les spécifications sont sujettes à modifications sans préavis.

KENWOOD strebt ständige Verbesserungen in der Entwicklung an. Daher bleiben Änderungen der technischen Daten jederzeit vorbehalten.

#### Note:

Component and circuitry are subject to modification to insure best operation under differing local conditions. This manual is based on, the Europe (E) standard, and provides information on regional circuit modification through use of alternate schematic diagrams, and information on regional component variations through use of parts list.

### For Europe and U.K.

#### FM tuner Section

Tuning frequency range ..... 87.5 MHz - 108 MHz  
Usable sensitivity (DIN) ..... 0.7  $\mu$ V

#### MONO

STEREO ..... 25  $\mu$ V

#### Limiting level (DIN at 75 $\Omega$ )

..... 0.45  $\mu$ V

#### Total harmonic distortion (DIN at 1 kHz)

MONO ..... 0.02% (WIDE)

STEREO ..... 0.05% (WIDE)

#### Signal to noise ratio

(DIN weighted at 1 kHz, 65.2 dBf input)

MONO ..... 82 dB

STEREO ..... 72 dB

#### Stereo separation (DIN)

1 kHz ..... 54 dB (WIDE)

6.3 kHz ..... 44 dB (WIDE)

#### Capture ratio

..... 1.0 dB (WIDE), 2.5 dB (NARROW)

#### Alternate channel selectivity

(DIN  $\pm$  300 kHz) ..... 75 dB (NARROW)

#### Image rejection ratio (at 98 MHz)

..... 82 dB

#### IF rejection ratio (at 98 MHz)

..... 110 dB

#### Spurious rejection ratio (at 98 MHz)

..... 105 dB

#### AM suppression ratio

..... 76 dB

#### Frequency response

(20 Hz - 15 kHz) ..... +0.5 dB, -0.5 dB

#### Output level/Impedance

(at 1 kHz, 100% dev.) ..... 0.6V/3.3k $\Omega$

#### AM Tuner Section

##### Tuning frequency range

531 kHz - 1,602 kHz ..... 9 kHz step

530 kHz - 1,610 kHz ..... 10 kHz step

##### Usable sensitivity

..... 10  $\mu$ V (350  $\mu$ V/m)

##### Signal to noise ratio

(at 30% mod. 1mV input) ..... 55 dB

##### Total harmonic distortion

..... 0.25%

##### Image rejection ratio (Loop)

..... 40 dB

##### Selectivity

..... 30 dB

##### Output level/Impedance

(at 30% mod.) ..... 0.18 V/3.3 k $\Omega$

#### General

Power consumption ..... 20 W

Dimension ..... W: 440 mm

H: 98 mm

D: 318 mm

Weight ..... 4.3 kg

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